

inCider

The Apple II Journal

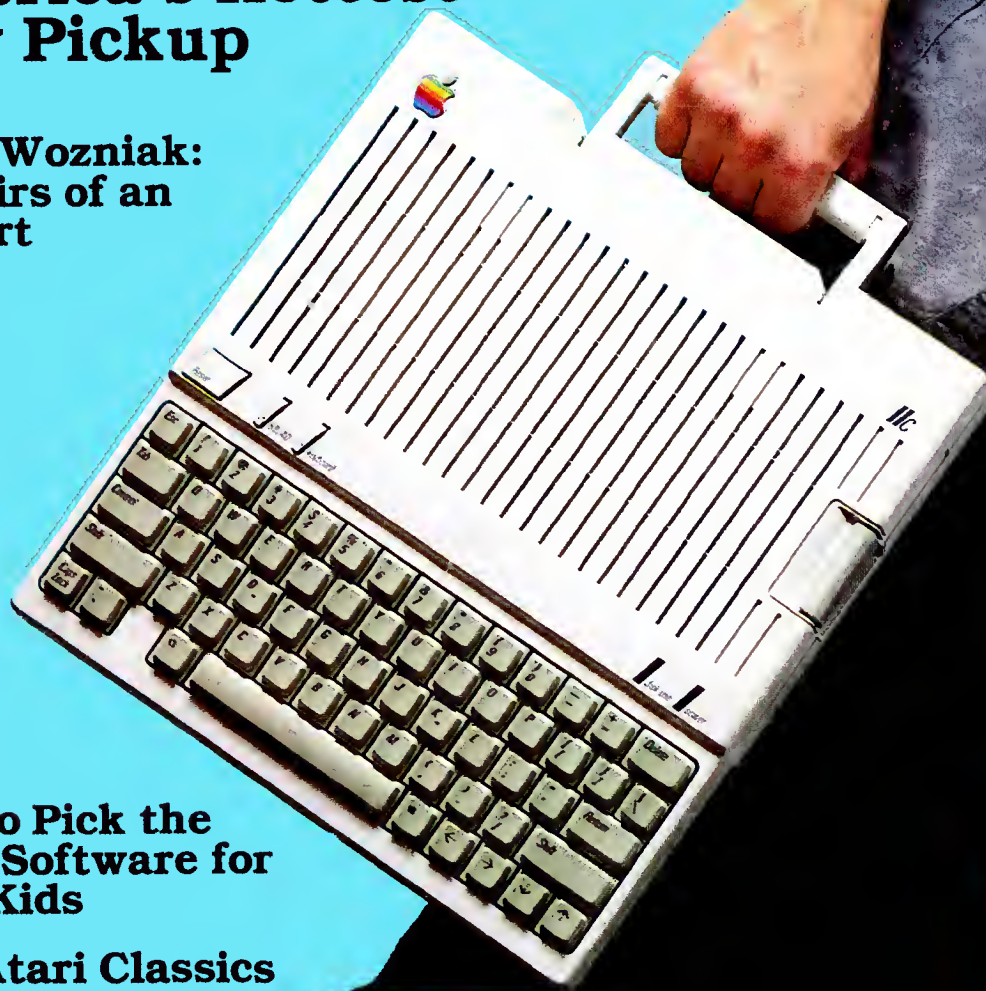
USA \$2.95
Publication

The IIc: A Look at America's Hottest New Pickup

Steve Wozniak:
Memoirs of an
Upstart

How to Pick the
Right Software for
Your Kids

Run Atari Classics
On Your Apple



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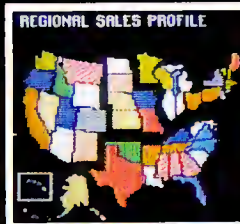
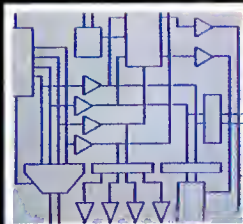
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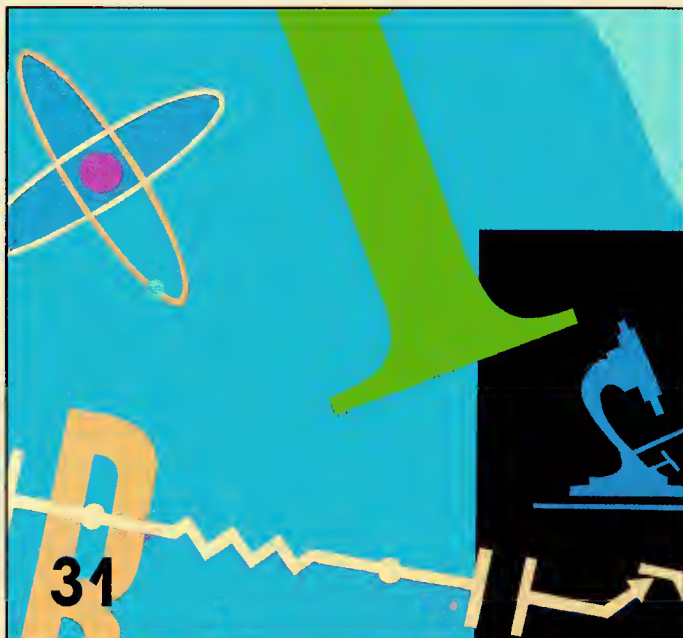
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31



52

ARTICLES

An Interview with Steve Wozniak *by Jeff DeTray*

An old electronics journal sparked a young man's man's imagination; he followed his dream through to becoming chief designer of a major computer company. Read his account of where he was and where he's going.

52

The Apple //c *by Bob Ryan*

It's a portable! Apple Computer is the proud parent of a 7½-pound, 12-inch baby that plays David to a certain Goliath.

60

Russian Word Processor *by Alfie Kohn*

Victor Svec, Russian teacher at Phillips Andover Academy, uses Apples to produce some of the best Russian language students in the country. He's also made his classes *very* popular.

64

Piano Keys *by Dan Dempsey*

Discover the true meaning of tuning up your machine! This program will help you compose yourself.

68

How I Survived a Tax Audit *by Fred Huntington*

He thought he was making a legitimate deduction; instead, he plunged into depths of despair. But victory, at last, was his!

74

Appleworks (review) *by Archie Mason*

We review the answer to a messy desk. This major new package combines word processing, data base management, and a spreadsheet into a tidy bundle that is well worth your investigation.

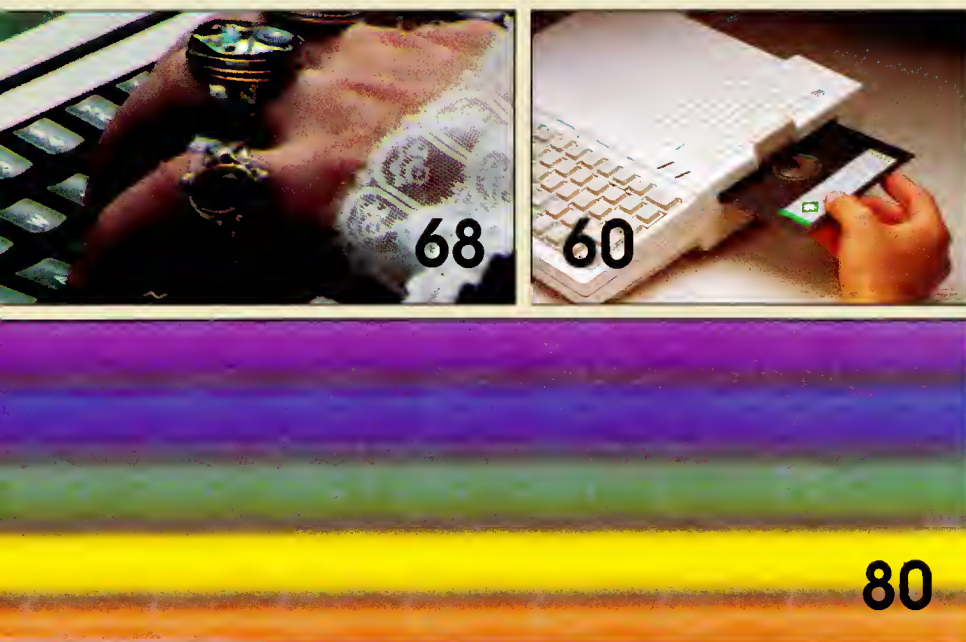
80

The Compleat Text File Primer Part 5—Sorting *by Lee Swoboda*

You may think sorting data is no more exciting than sorting laundry, but your computer has five nifty ways of figuring out what goes where. Try these techniques on your socks.

84

OF CONTENTS



DEPARTMENTS

Fermentations	6
Letters	10
The Game Reserve	15
Monsters, Battles, Aliens, Action . . .	
The Glau Report	23
Three for Your Money	
O'Brien's Journal	27
Productivity: The Name of the Game	
The Learning Machine	31
Educational Computing at Home	
Child's Play	35
Munch Mouse	
The Applesoft Adviser	41
The Basics of BASIC	
The Cider Press	48
News of the Apple world.	
Consumer Alert!	49
inCider's inSidious inSolubles	51
The Banker's Dilemma; The Wayward Timer	
Fudge It!	92
Hi-Res Text Typing; Part 1	
Ask inCider	99
Answers to your software and programming questions.	
The Apple Clinic	102
Easy on the Fingers; Joyshtick; Aces Again	
Hints 'n' Techniques	114
Coded Patchwork for The Inspector; Professional Numbers	
Apple Extract	117
Six months of capsule reviews.	
Software Reviews	124
The Eating Machine; VODAC—The Alpine Encounter; The Writer; Word Blaster; Kidwriter; The Factory; Break	

the Bank Blackjack; Preschool Skill Builders; Paper Graphics; Masquerade; In-The-Mail; One-on-One; Homeword	
Calendar	139
Book Reviews	140
Getting the Most from Your Micro; What Do You Do After You Plug It In?	
New Software	145
New Products	155

Cover photo by Frank Cordelle



Submissions: We're always looking for first-class manuscripts at *inCider*. We'll consider publication of any material for the Apple. Guidelines for budding authors are available—just address an envelope to yourself and include it with your request. Mail manuscripts or requests for writers' guides to: *inCider* Editorial Offices, 80 Pine Street, Peterborough, NH 03458.

inCider (ISSN #0740-0101) is published monthly by CW Communications/Peterborough, Inc., 80 Pine Street, Peterborough, NH 03458. Phone: (603) 924-9471. Application to mail at second class postage rates is pending at Peterborough, NH, and additional mailing offices. Subscription rates in U.S. are \$24.97 for one year, \$38.00 for two years and \$53.00 for three years. In Canada and Mexico, \$27.97—one year only, U.S. funds drawn on a U.S. bank. Foreign subscriptions (air mail), please inquire. All U.S. and Canadian subscription correspondence should be addressed to *inCider*, Subscription Department, P.O. Box 911, Farmingdale, NY 11737. Please include your address label with any correspondence. Postmaster: Send address changes to *inCider*, Subscription Services, P.O. Box 911, Farmingdale, NY 11737. Entire contents copyright 1984 by CW Communications/Peterborough, Inc.

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FERMENTATIONS



Chapter //

So, how do you like the new cover design? Pretty nice, eh? And how about that new logo—you know, the clean one without the chubby little apple? Well, much as we hated to risk an identity crisis, we figured that the best way to alert everybody to the new things going on inside *inCider* was to grab them quickly on the outside. But I'm getting ahead of myself.

Magazine people, especially those of the computer persuasion, relish change. They live for self-critique and, to a man (or woman), would gladly sacrifice all in pursuit of the Perfect Issue. And so it was neither unnatural nor capricious that the *inCider* team followed up a highly-productive 1983 *not* with a round of back-slapping, but with an unmerciful and agonizingly detailed reform program!

In a second I'll tell you about the actual changes in this renaissance issue, but first let me cover a few precepts that guided us through the remodeling process.

First, Apple II owners, i.e., our readers, are obsessed with extracting maximum mileage out of their machines.

Second, a growing number of our

readers are more inclined to purchase software than program their own (or key in industrial-strength listings from a magazine).

Third, we fully recognize, on the other hand, that there will always be a significant number of readers who have a hankering to hack.

Fourth, Apple II users are a distinct species. They are more than a little chauvinistic about their machines, they are well-educated, they enjoy keeping up with new developments, and most of them view computers as important tools for a progressive society.

So much for background information... let's talk specifics. Personal productivity is what Bill O'Brien will be championing in his new column, O'Brien's Journal. Loosely translated, personal productivity means making your Apple become the biggest "lever" possible in converting your time and effort into computer output. What O'Brien says—and he'll be saying a lot—will find a receptive audience with anyone concerned with how efficiently they conduct their computer affairs.

These very same people will appreciate The Glau Report. Greg Glau, like Bill O'Brien, has been writ-

ing a column for *inCider* since way back when. He is up-shifting from his former column, Bent on Business, to putting all that accumulated small business savvy to work as a reviewer. Each month, The Glau Report will focus on a different genre of small-business-oriented software. Within each category, Glau will spotlight three leading packages in a no-holds-barred comparison. Readers will get an objective appraisal of popular software while, at the same time, getting advice on the criteria to use when making buying decisions.

If you're a parent, you know that your Apple holds enormous potential as a teaching tool for children. On the other hand, you're probably not about to turn your young and impressionable offspring over to just any software. That's where our next new column, The Learning Machine, comes in. Authored by Fred Huntington, long-time educator, former software publisher, and parent of two, The Learning Machine will help you chart a course through the bewildering new world of home education software.

Now, just so you won't think we're taking things too seriously, we thought we'd include something a

by Paul Quinn

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FERMENTATIONS

little lighter—something just for fun. What's your pleasure—arcade, adventure, strategy? You'll find it all in The Game Reserve's overview of what's going on in the world of Apple entertainment. Luckily, some time back we made the acquaintance of the (in)famous Warden Shiftky, who is to games what Ronald McDonald is to burgers. Tab, as he is known for short, readily consented to pen our games column, pointing out that it's a dirty job but somebody has to do it.

Here's a rundown of the other new features coming in this issue of *inCider* and in the months to come:

The Cider Press. An entertaining look at happenings in the multifaceted world of Apple computing.

Ask *inCider*. A question and answer column to help solve your software and programming problems.

Apple Extract. Thumbnail sketches of *inCider's* product reviews for the previous six months, updated monthly. For the computerist who wants to survey a lot of software and hardware quickly.

Additionally, you'll notice a revolutionary hand at work in our continuing columns and departments. For instance, The Applesoft Adviser is now an on-going, structured course in BASIC. Author Dan Bishop will take the first-time user from square one right through to the intermediate stages of programming.

Likewise, Fudge It! will introduce readers to the magical world of Apple graphics. Don Fudge has reformatted his popular column to devote more space to tutorial material, drawing heavily on his experience as a graphics programmer and software publisher. Here is solid reading for all levels of computerists, including the advanced user.

Child's Play (nee Interaction—A Child's World) will be just what its title implies. With an emphasis on brevity and nonviolence, this department will present original game listings that provide entertainment and constructive exposure to computers

for youngsters of preschool age. Most of these programs can be parent-key-stroked in less than thirty minutes.

And now a word about the review section: Timelier. We're pulling out all the stops to make *inCider's* reviews as current as our production schedule will allow. Simultaneously, we're redoubling our efforts to uncover all significant new products—and there's a slew of them—being produced for the Apple II family of computers.

Some things won't change at all. The Apple Clinic, for instance, will continue aiding users with hardware questions. Likewise, our Hints & Techniques department of brief how-to-do-it's remains essentially the same, as does *inCider's* inSidious inSolubles, a popular recent addition devoted to challenging your wits.

So far I've been talking only about columns and regular departments. But our feature material, too, will reflect positive change. Real-world applications will occupy the lion's share of our feature section each month; we aim to make it impossible for you to thumb through the magazine without discovering at least one way to improve the utilization and enjoyment of your Apple. Whether your preference be word processing, dbm, accounting, home finance, graphics, small-business management, self-improvement, mailing lists, utilities, telecommunications, education, networking, printers, stock market analysis, games, speech synthesis, bulletin boards, or any of the hundreds of other applications possible on the Apple, we'll do our best to accommodate you with clearly written, no-nonsense material of tangible and immediate benefit.

But enough talk. I think you've got an idea where *inCider* is headed. If we've done our job correctly, you won't be able to put the magazine down in less than half an hour—well, twenty minutes, bare minimum. Speed readers will be prosecuted. ■

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LETTERS

Filling Memory

David Lowe's article "Clearmem" (April 1984) invites comments. First, the program that writes the exec file CLEARMEM INIT doesn't work as published; it will if line 100 is changed to PRINT "POKE 103,1" and another line is included, such as 90 PRINT "POKE 768,0". An Applesoft program must be preceded by a 00 byte, which is not likely to be found at \$2FF.

Second, Lowe had the incredible luck that the machine code overlays the CLEARMEM DRIVER program in a way William Tell would have been proud of. If the code had been just one byte longer or shorter, the whole program would have broken down. Try deleting the semicolon in line 5 (which normally would not be required) or adding a colon at the start of line 5, and you'll see what I mean. I call this living dangerously, to say the least.

Third, \$9600 is already in DOS; free memory ends at \$95FF. Lowe's programs fill correctly to \$95FF only, although the text and prompt mention \$9600.

Finally, the following single short program achieves the same effect as Lowe's three programs (which give four on the disk).

George Vogel
Department of Chemistry
Boston College
Chestnut Hill, MA 02161

```
10 ::: REM : "MEMORY FILLER" - FILL
    LLS MEMORY $800-$95FF WITH SE-
    LECTED BYTE
20 HOME
30 D$ = CHR$(4):N$ = "DISCARD"
40 PRINT D$;"OPEN"N$
50 PRINT D$;"WRITE"N$
60 PRINT "HOME:POKE 2048,B:CALL-
    151"
70 PRINT "B01<800,95FEMN3D06"
80 PRINT "HOME"
90 PRINT "PRINT:PRINT CHR$(68)CH
    R$(79)CHR$(78)CHR$(69)"
100 PRINT D$;"CLOSE"
110 INPUT "INPUT BYTE (DECIMAL)
    TO FILL MEMORY: ";B
120 PRINT D$;"EXEC"N$
```

Micro City and Micro Listings

I want to complement one of your advertisers, Micro City of Downers Grove, Illinois. They are very courteous and helpful. Linda and Shelley do everything they can to fill orders and they ship when they say they will. In most cases I have my order the next day. Again, good work, Micro City.

I don't like the small type you use in the program listings in *inCider*. I have to use a magnifying glass to see the listings when I type them in. Please use larger type.

Thomas A. Marcinko
R.R. #6 Box 304
Frankfort, IN 46041

MacCover

I've enjoyed your magazine over its entire lifespan. I've been a subscriber since the first issue. I recently lost my Apple II Plus from a house burglary and replaced it with a Macintosh. I trust your future plans include publishing Macintosh articles, and this letter is intended to spur that effort. I even designed a magazine cover for you using MacPaint and inserted it into this letter, done with MacWrite.

**Name and address withheld
at reader's request**

Sorry to disappoint all you Macintosh and Lisa owners, but after much discussion and research, we have decided to continue concentrating on the Apple II line. —eds.



Serpent Strikes Again

I was shocked to read Thomas Zuchowski's comments in April about Serpent (February 1984). Although his modifications may be helpful to some beginners, you need not be satisfied with scores as low as 300 when you can reach 2000 points. Want some hints on becoming a snake charmer?

First, by developing a traversing pattern of play, you can keep the serpent's tail in a solid block. With a little traversing practice you can reach 800 points while filling only 2/3 of the serpent's den. At 800 points the serpent's tail drops off from its head. The tail will remain immobile on the screen but the head will begin to grow another body as in the beginning. You could still have 1/3 of the den area free to score an additional 400+ points.

Once you have mastered the above technique the fun has just begun. With a little luck one of those edible squares will appear in the bottom wall. Your serpent may exit through it without crashing and go to the open area either left or right of the game walls. After exiting, if you stay against the bottom wall the serpent will still remain slightly visible. Do not exceed the monitor's boundaries.

The ultimate Serpent gaming technique is to exit the bottom wall just short of 800 points, fill the left and right sides with the serpent's body, and reenter the serpent's den through the same opening. Then eat squares to get your score to 800 points. Your snake's tail will drop off outside the den, you will have a new snake to grow with, and you will have the whole den free to traverse up another 1200+ points.

For additional variety and even higher scores, change line 420 to read "RR = 1". You can also change line 350 to read "XC = 1".

Richard Spindler
1754 Conners Road
Baldwinsville, NY 13027

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LETTERS

A Situation Situation

inCider is a great magazine and each issue brings more pleasant surprises. "The Apple Clinic" has helped me to learn more about my computer and problem solving. Perhaps my recent experience may be of help to other readers.

Through trial and error I recently discovered that the positioning of my monitor was the source of interference to my two drives. The monitor was located on top of my drives, which were placed on a shelf directly over the Apple. It became difficult, and in some cases impossible, to boot most of my programs. Realigning both drives and placing drive 2 in the boot position did not improve the situation. Placing the monitor on the shelf above the computer and the drives, one on top of the other, to the right of the monitor cleared up the problem.

John de la Fontaine
1502 Palomino Way
Lakeland, FL 33801

Called to Account

Anyone following W. E. Crowell's VisiCalc template for preparing tax returns (April 1984) had better be ready to file an amended return. While his tips on using the IF and LOOKUP commands are helpful, several of his tax laws differ from those of the IRS.

1. Only medicine, not insurance, is subject to the initial 1% floor of adjusted gross income (AGI).

2. The allowable medical deduction is the amount that exceeds 5% of AGI, not 3%. (That was the law in 1982.)

3. Casualty losses are deductible only if they exceed 10% of AGI after deducting out the \$100 floor per casualty. This also was new in 1983.

4. The zero bracket amount that must be subtracted out of your itemized deductions before calculating taxable income is \$3400 for a married couple, not \$2300. The

\$2300 is the amount for a single person.

You will need Form 1040X to amend your return.

Arthur E. Reed, CPA
21 Fowler Street
Quincy, MA 02169

Write Away Update

Your review of our Apple word processor "Write Away" (March 1984) was most flattering, and we thank you. However, because of the nature of the publishing industry and the rapid changes of the software industry, it was impossible for you to review the current version of Write Away. The following changes are important for your readers to know if they are considering Write Away, because among them are some hardware restrictions:

1. Write Away will no longer run on a 48K Apple. A language or 16K card is now required on the Apple II/II Plus.

2. No minor surgery is required on the Apple IIe. For a nominal fee, Midwest Software will provide the module necessary to enable normal shift key operation, which is now required, and use of the control key to obtain eight user-definable function keys. The function keys do not require this hardware modification. You can reach them in other ways.

3. When you mark a block of text for movement or deletion, the block is now highlighted.

4. You can now fill the "save" buffer with 4095 characters without losing the HELP screen.

5. The system is now protected against reset, although it does revert to 40-character mode. Control-V brings back the 80-column display. On the Apple IIe a control-V will toggle between the 40- and 80-column displays.

6. Word wrap is in effect in insert mode and is adjustable. If text is inserted using the deferred insert command described in the review, words will extend past column 80.

However, the command "nEF [ESC] [ESC]" ("n" being the desired word wrap column) will reblock your text at the desired word wrap column. If no "n" is specified, the word wrap defaults to the screen width.

7. The "Address of printer" item on the format menu, the one calling for "1EOn", has been eliminated. You can now enter just the slot number of your printer.

In addition to the above, "revision marking" (used by attorneys) is now available, and the soft hyphen character can be changed to any ASCII character.

John L. Mellitz, President
Midwest Software
Associates, Inc.
1160 Appleseed Lane
St. Louis, MO 63132

On Par with Golf Slice

I would like to commend Floyd Berghout on his wonderful program, Golf Slice II (April 1984). It was fantastic to type in a program that actually worked. However, I made a few modifications.

The course for the twelfth hole wasn't drawing correctly, and the whole program was stopped with an ILLEGAL QUANTITY ERROR IN 10120. Change line 5060 to fix this:

```
5060 DATA 12,4,250,150,60,40,59,44,  
50,100,110,125,175,125,175,180,50,  
180,110,50,110,90,160,60,0,0,225,100
```

I made two other changes because my brother had problems with pressing the right key for hitting or putting. If he pressed the wrong key, he couldn't correct it. These additions make the program more user-friendly:

```
204 IF CLUB = 0 THEN SC(PL) = SC  
(PL) - 1: GOTO 150  
3007 IF CLUB = 0 THEN SC(PL) = SC  
(PL) - 1: GOTO 150
```

Once again, congratulations on a superb job.

John Pratt
191 E. Opal Drive
Glastonbury, CT 06033

Apple's® new ProDOS™ is pro Thunderclock™

When Apple designed their new ProDOS operating system for the Apple II family, they included an important new function—the ability to automatically read a clock/calendar card. Nice touch.

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Now you can instantly know the exact time your files were last updated.

Apple could have chosen any clock for ProDOS to recognize, but they chose only one.

Thunderclock. It's the only clock mentioned in the ProDOS manuals.

That's a nice stroke for us, but it's even better for you.

Because, in addition to organizing your disk files, Thunderclock will add a new dimension to all the new ProDOS-based software. For instance, with business or communications

software you can access a data base or send electronic mail automatically, when the rates are lowest. Even when you're not around. And that's just a start. The better you can use your Apple, the better you can use a Thunderclock.

Thunderclock gives you access to the year, month, date, day-of-week, hour, minute and second. It lets you time intervals down to milliseconds and is compatible with all of Apple's languages.

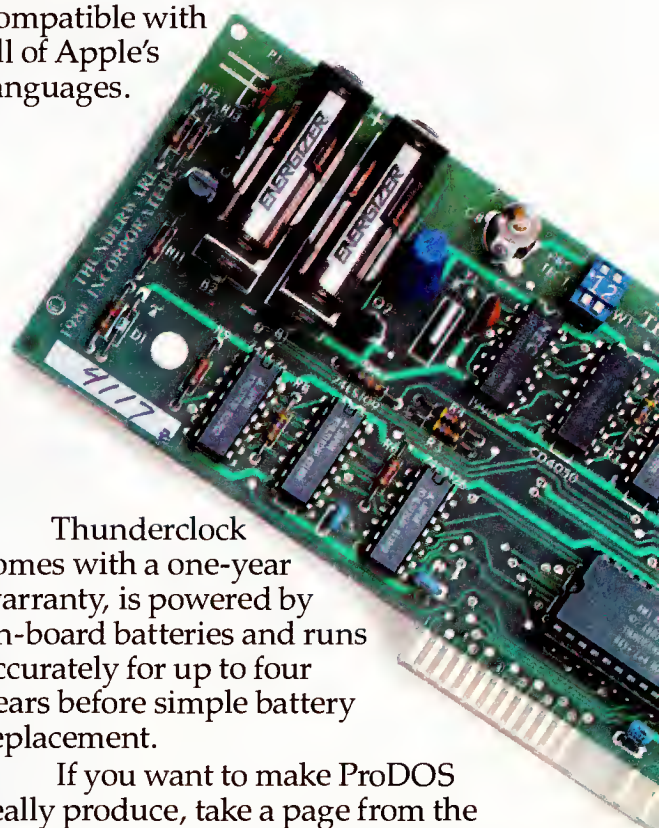
Thunderclock comes with a one-year warranty, is powered by on-board batteries and runs accurately for up to four years before simple battery replacement.

If you want to make ProDOS really produce, take a page from the manual—get yourself a Thunderclock—the official ProDOS clock.

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Apple II ProDOS User's Manual



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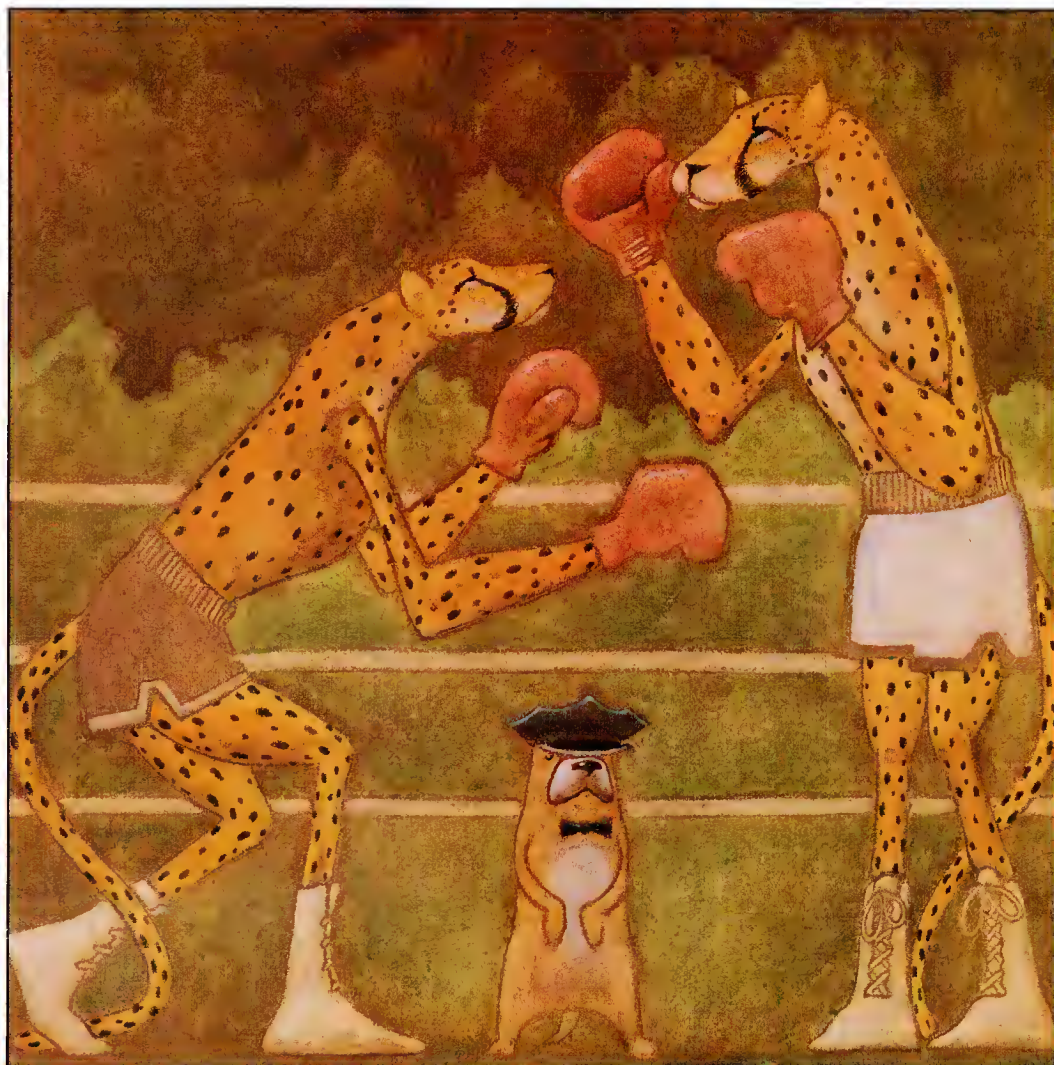
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Monsters, Battles, Aliens, Action...

Remember when you bought your Apple II? What was it you told your spouse? Wasn't it something about balancing the home checkbook, using the Apple as a learning or an earning tool, doing the taxes with it, keeping your files and recipes? When you went to the computer store, didn't you tell the salesman the same things? Sure you did. You didn't want to embarrass yourself by revealing what you really wanted it for.

And to be sure, you actually bought a home checkbook program, a file-keeping program, and maybe a learn-to-count program for your kid. You also told the salesman that you'd like to "hold off on the income-tax preparer and VisiCalc for now" because you wanted to "know a little more about the computer" first. Sure you did! Of course that didn't stop you from buying just two more programs "for the kids": Raster Blaster and Choplifter.



Boy, are you sneaky! You feed all these people your line about doing your taxes, teaching your kids algebra, putting all your recipes on a computer file, and maybe learning touch typing, but what you actually do is spend ninety percent of your computer time playing video pinball and rescuing quarter-inch-tall refugees with

Write to Warden Shiftky at inCider, 80 Pine Street, Peterborough, NH 03458.

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If you have an Apple II, Apple II Plus, or Apple IIe, we have good news for you. Now there are two inexpensive software programs that can turn your Apple into a much more valuable tool.

Softerm 1 connects you with information services.

Softerm 1 lets you retrieve information from services such as *The Source*,sm *CompuServe*,[®] and *Dow Jones News/Retrieval*.[®] Plus, gives you the ability to access bulletin boards and send or receive electronic mail. Other features include user-defined keyboard macros, built-in phone book for automatic dialing, terminal mode line capture simultaneously to print or disk, copy screen to print or disk, and terminal status display.

Softerm 2 connects you with your company's computer.

This expanded version of Softerm lets you gain access to the information stored in your company's main computer from your home or office. With either version of Softerm, you can download information into your Apple and capture it on your own disk

in any format you choose—DOS, CP/M[®], or Pascal. Also included with Softerm is a source program for your host computer to ensure compatibility with Softerm's file transfer capabilities.

Makes your Apple work exactly like any major terminal.

Softerm 2 provides complete emulation of these terminals: ADDS Regent 20, 25, 40, 60; ADDS Viewpoint; Data General D200; Datapoint 3601; DEC VT102, VT52; Hazeltine 1400, 1410, 1500, 1520; Hewlett-Packard 2622A; Honeywell VIP7205; VIP7801, VIP7803; IBM 3101 Model 10 and 20; Lear Siegler ADM-3A, ADM-5 and TeleVideo 910, 925, 950. And the list is growing all the time. We'll send you a User's Guide, handy reference card, and a telephone number to call if you need more assistance.

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an animated helicopter. You're my kind of guy (or gal).

Because I understand and fully sympathize with your point of view, I dedicate this new *inCider* column to you. I identify with you because you didn't buy your computer for some dull, uninspired business purpose. You bought your computer—and let's be honest about this now—to party with. You're not obsessively concerned with the inner workings of your Apple II any more than you worry about what makes your TV or your toaster work—people like you and I leave the hardware tinkering and software authoring to engineers and programmers.

We are interested in high-tech, state-of-the-art play. We want flash, sound, color, excitement, thrills, and a challenge that tests the mind or the reflexes or both. We seek exotic scenes, strange monsters, epic battles (especially against hopeless odds), and fast, furious action. That's what Apple computer games are all about—when they're good.

Allow me to introduce myself. My name, at least in these pages, is "Warden Shiftky" (don't laugh, they almost named me "Zaphod Beeblebrox"). Like you, my first love is game-playing. I vow to defend to the last drop of ink in my pen our right to play them, unashamed of the use to which we're putting our computers. It's true that I use my own Apple II Plus for programming and writing articles, but my favorite computer activity still remains game playing. My mission in this column is to tell you about good new games as they come on the market, to let you know

what's coming up in the world of games, and to let manufacturers know what you're thinking. There will still be reviews from the rest of *inCider's* writers to round out the general gaming picture.

The Warden Shiftky Poll

I thought it would be fun to begin this column with an exercise in democratic game criticism, a poll of your all-time favorite games in three categories: arcade, strategy/fantasy, and adventure.

Here's how the poll will work: You send me a list of your three all-time favorite games in each of these categories. I'll count the votes, and in an upcoming "Game Reserve" I'll announce the top ten vote-getters in each category.

To qualify for the poll, a game must be commercially published and be available for the Apple II family. The games may have been published at any time since the introduction of the Apple II. They don't have to be current best-sellers. They must be for recreational use; educational games don't qualify and won't be counted.

Write your three choices on a card or in a letter and send them to:

"Warden Shiftky"

inCider

80 Pine Street

Peterborough, NH 03458

The idea of this poll is to let the old Warden know what his readers are thinking, what they like, and how they define a "great" game. To get the ball rolling, allow me to publish, here and now, my ten all-time favorite games in each of the three

categories. If nothing else, the lists should tell you what I like in games and how to weigh my opinions.

I want to find out what your preferences are. I'll be very surprised if you can't put together much more interesting lists than I just did. So, hop to it and send in your votes so we can name, once and for all, the greatest Apple games of all time!

If you like, you may also send in your nominee for the worst computer game of all time. The qualifications are the same as for the best games, but with these special criteria: little or no graphics or sound effects, clumsy animation, stupid or boring premise, sluggish action, too little (or too much) difficulty. Send in a brief comment with your nominations, justifying your choice. The choicest comments will be published (in expurgated form) at the discretion of Warden Shiftky and the editors.

Assuming I get a brisk response to this unscientific poll, I'll publish the results in an upcoming "Game Reserve." I'll keep you posted. Meanwhile, you get busy on your ballot!

Atari On Your Apple

One of the major ironies in the history of the Apple II is that Atari, Apple's former arch-rival for the home computer market, is now issuing Apple versions of their most famous arcade games. Atari used to be the single most profitable part of the Warner Communications empire, but no more. The Atari 400 and 800 never carved out the chunk of the market they were expected to and the 1200 was considered by

My Top Ten Arcade Games

1. David's Midnight Magic
2. Alien Rain (Computer Galaxian)
3. Star Blazer
4. Gobbler
5. Raster Blaster
6. Nightmare Gallery
7. Threshold
8. Way Out
9. Choplifter
10. Beer Run



My Top Ten Strategy/Fantasy Games

1. Wizardry
2. Fighter Command
3. Ultima I
4. Computer Bismark
5. Tactical Armor Command
6. Beneath Apple Manor
7. Battle for Normandy
8. North Atlantic '86
9. Close Assault
10. Computer Quarterback

My Top Ten Adventure Games

1. Cranston Manor
2. Wizard and the Princess
3. Zork I
4. Time Zone
5. Suspended
6. Gruds in Space
7. G.F.S. Sorceress
8. Blade of Blackpool
9. The Coveted Mirror
10. Mummy's Curse

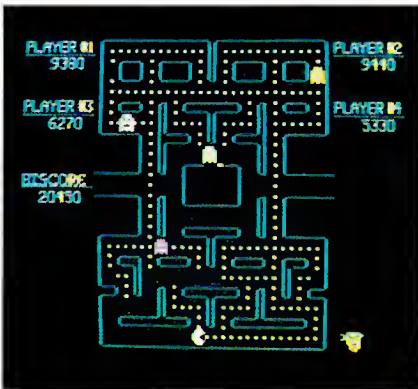
some computer experts and commentators to be ill-conceived.

It's a pity that the 400 and the 800 didn't do better than they did because they are very fine units, especially for game playing. The graphics are outstanding, color mixing is superb, and sound effects are wonderful using the television speaker.

Now don't get your backs up just because a few kind words about the opposition have been uttered; Warden Shiftky still loves his Apple best, but as a fanatic game player, he loves his Atari too.

The trouble is that Warner never marketed their units very successfully. They didn't encourage third-party manufacturers the way Apple did and never undertook to sell their 800 computer to business users. The 800 would have made a great business computer.

So, Apple owners are now reaping the benefits as Atari changes its former policy of keeping the computer versions of famous coin-op games to themselves. Atarisoft, Atari's software label for Apple products, has come out with seven famous-name games that range from good to excellent in playability and excitement. The ones I've seen are: Pac-Man, Centipede, Dig Dug, Robotron: 2084, Stargate, and Defender. The seventh is Donkey Kong.



Pac-Man

Pac-Man

Pac-Man is the most famous title of the Atarisoft games. Curiously, although it's very good, it just isn't the best Pac-Man or Pac-Man ripoff I've seen (that distinction goes to Sierra On-Line's 1981 game Gob-

bler). Be that as it may, the Atari version looks good and plays very well.

The game is the same old Pac-Man you know and love from the coin arcades. There are four goblins (does anyone *not* know by now that their names are Inky, Blinky, Pinky, and Clyde?) who chase Pac-Man as he gobbles up the dots that line the maze. When Pac-Man eats the big energy dot (sometimes called "the vitamin" by gamers I've overheard) the ghosts turn pale blue. Pac-Man feasts on them for 200 to 1600 points, depending on how many he can devour before the vitamin wears off. You can't win. Eventually the goblins will get you. What you can do is clear all the dots from the maze or amass 10,000 points, which gives you another life—for the goblins to take.

What's my bottom line on Atari-soft Pac-Man? I rate it low average on looks and sound, above average on ease of play, and superior in excitement and challenge.



Centipede

Centipede

Centipede is another Atari famous name that had Apple imitators and look-alikes long before the Atarisoft release this year. But even though Centipede isn't a new idea for Apple gamers, the Atari version has one important factor going for it that always means you're playing a good arcade game. It's addictive.

As Warden Shiftky's motto states, "The play's the thing." In this case, the play moves swiftly as you use joystick or key controls to position a bug blaster along the bottom of the screen to shoot invading centipedes, spiders, scorpions, and frenzied fleas infiltrating your mushroom patch.

You can move your blaster up or down a few rows and from side to side to shoot the advancing vermin or to avoid their attack, which is always fatal to your blaster. (You get three per game.)

It's a dangerous environment for you and your blaster. The touch of any of the insects can kill and a few of them, like the jumping spider, always seem to be just one step behind you. The red centipede is your main target. You have to shoot and kill every segment of the creature. A shot that cuts it in half just creates two new centipedes. You'd be wise to kill the scurrying scorpion as soon as it appears. It poisons the mushrooms in your patch, which has the effect of driving the centipedes insane. Insane centipedes tend to charge bug blasters.

No matter how well you shoot, you can't win; the supply of nasty little bugs is inexhaustible. If you earn 10,000 points, however, you'll get a new bug blaster. Successive additions of 10,000 points to your score continue adding blasters to a maximum of six.

Warden Shiftky's impressed with Centipede. It plays well, has good graphics and is so addictive he barely got this column written in time. On to Robotron!



Robotron: 2084

Robotron: 2084

Robotron: 2084 is one of the best of the six Atarisoft games I saw. In this adaptation of the Williams' coin-op game, your job is to rescue humans menaced by hostile robots. The mechanical bad guys come in a variety of sizes and a range of meanness. The hulking mindless grunts are the

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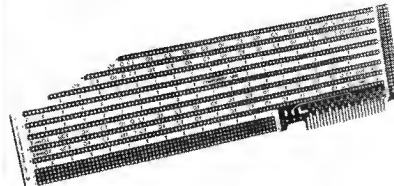
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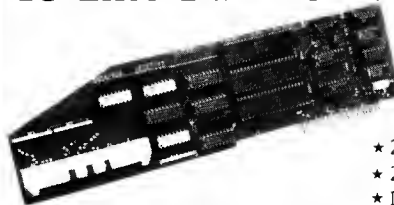
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The GAME RESERVE

most numerous and to touch them is instant death. The spheroids and quarks are a lot more dangerous. The spheres move very rapidly and the two units can create enforcer and tank robots. In no time at all the screen will be thickly crowded with hostile robots, robot brains, and snaking beams of energy that follow you with uncanny precision. It will take all your gaming skills to reach 25,000 points and win an extra life.

Warden Shiftky was so seriously addicted to this game that his family and friends nearly gave up hope on him, which may not prove anything. Warden Shiftky's family and friends nearly give up hope on him roughly three or four times daily. This is one of those games that will rivet you to your seat and force you to play over and over and over. Enough said.



Defender

Defender

Atarisoft's version of Williams' Defender is another of the best arcade recreations. Levels of play are selectable from easy to normal to hard, and one or two players can participate.

In this game, you pilot a jet plane as it skims low over the surface of an alien world under attack. A small band of humanoids is being kidnapped one by one by the alien landers, who snatch them up and take them away into space. By pressing the fire button, you send laser beams to destroy the fleet of alien ships. You have a limited supply of "smart bombs" that will kill all alien ships in view; just be very sparing in their use because it takes 10,000 points to replace one.

There are complicated penalties

for failing to protect the humanoids. If you're too slow, the variety and effectiveness of the enemy ships increase. Where you once had to contend mostly with landers, you'll now find baiters darting back and forth shooting at you and pods that release swarms, which follow your plane relentlessly until they score a kill. If you lose all the humanoids and the aliens turn them into mutants, the planet explodes.

Warden Shiftky likes Defender very, very much. The graphics and the sound effects are good and the action is fast, violent, and non-stop. Killing off the aliens while managing not to destroy your own people requires quick tactical thinking and swift reflexes. Standing up and walking away from Defender requires enormous will power.



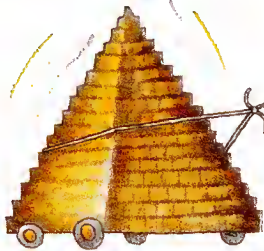
Stargate

Stargate

Williams' Stargate, as recreated by Atarisoft, is a sort of "super-Defender." The premise is the same as that of Defender, and your ship has the same lasers and smart bombs. There are a few differences, though. One is the presence of the Stargate (which will pluck you from the game you're in, move you ahead a few waves, and renew your humanoids). Another help is the Inviso Cloaking Shield that will make your plane invisible and that is death for any alien to touch. On the other hand, your problems increase as well. The aliens have 14 classes of ships (compared to six in Defender) to throw at your plane, making this a very challenging game indeed. In fact, as much as I like Defender, I like Stargate even more!

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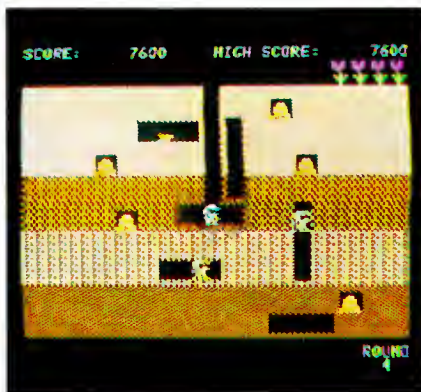
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The GAME RESERVE



Dig Dug

Dig Dug

The last entry in this selection is one of the most entertaining arcade games I've ever played—Dig Dug. In this game you control Dig Dug with keyboard or joystick commands. Your commands move him vertically and horizontally. Dig Dug starts the game at the center of an underground world and all he wants is a square meal, which you can procure for him by undermining orange rocks. The catch is that the rocks are guarded by dragons and robots who usually pace harmlessly within their subterranean lairs, but who also sally forth from time to time as ghosts to chase and kill Dig Dug.

Dig Dug can fight back by using his pump. Firing the joystick button shoots the end of the pump hose into any enemy within range. Then, all you have to do is keep pressing the fire button until the enemy inflates to the point of bursting. Once you've cleared off all the monsters, the scene stops and Dig Dug winds up on the next level, with even more monsters to fight. If you earn him 10,000 points, he will get another life. That life comes at 40,000 points, so keep moving, jab those monsters, and pump that air!

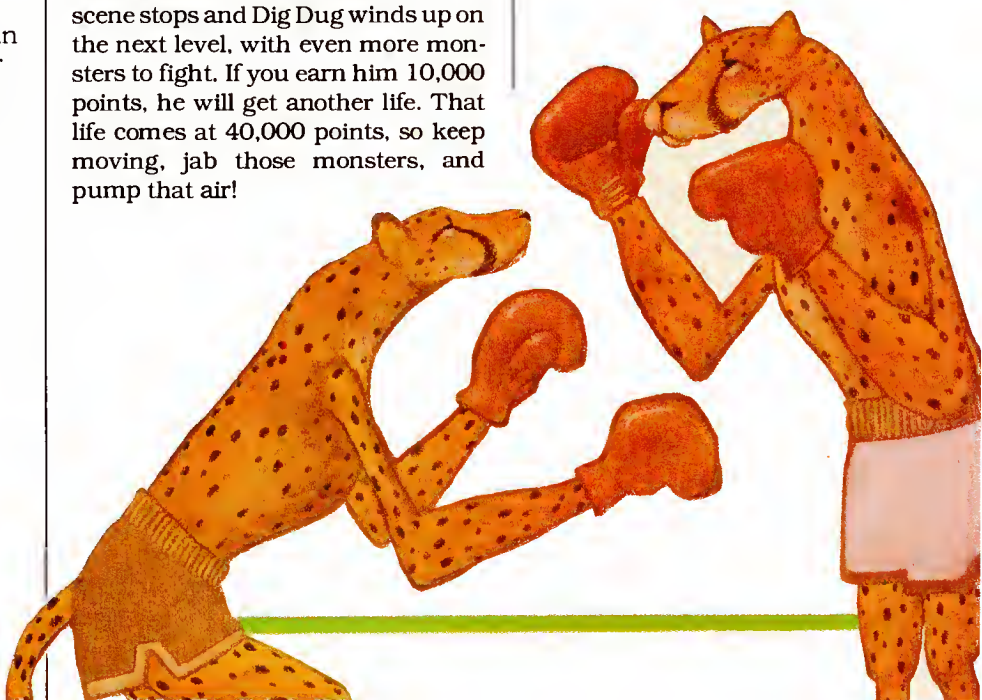
It's a tough pick, given the great playing qualities of all the AtariSoft games, but Warden Shiftky's favorite is Dig Dug. The color animation and design of the game are the greatest, and the element of humor works in enriching the entertainment value of this exciting game.

Back to the Reserve

It looks as though Atari has a set of winners. The future for AtariSoft looks rosy, assuming the same high standards of quality are met in their upcoming releases. By the time you read this, the AtariSoft catalog will also include such famous titles as Ms. Pac-Man, Jungle Hunt, Moon Patrol, Pole Position (I can hardly wait to play that!), and Galaxian.

If you ask me (and I know you didn't, but I'll tell you anyway) this release is long overdue. These are the authoritative versions of the famous coin-op games and Atari has done a very good job in adapting them for the Apple II, while maintaining high standards of quality and playability. As belated as it may be, Atari's entrance into the world of Apple couldn't have been more auspicious. Welcome aboard!

Well, it's time for Warden Shiftky to inspect the Reserve. I hope you liked this first outing with me and that you'll send in your game selections for the poll. I'll be seeing you next month when I bring you news about the world of Apple computer games. ■



Three for Your Money

It seems that almost any small business could use an uncomplicated and easy program to handle certain kinds of data. Are you required to keep warranty information on the products you sell? Is your inventory fairly small? Would you like to create simple invoices or pull information from a data base and insert it into form letters sent to specific customers? As with any software program, it all comes down to what your needs are, but there's no reason to buy a complex (and expensive) data base system if one half the price (and twice as easy) will do the job for you.

I'm going to focus here on three of the simplest and most popular file handling systems for your Apple: List Handler, PFS: File, and Quick File. Of these, Quick File runs on the Apple //e only. PFS: File comes in versions for both the Apple II and the //e. The main difference is that the program designed for the Apple //e will access and use its 80-column card, displaying your file characters in upper- and lowercase. The single version of List Handler runs on both the II and the //e. None of these systems require that you speak computer, and you could probably work with any of them without reference to the program manual. What's right for you will depend on precisely what you'd like to do with it.

Requirements

Both List Handler and PFS: File allow only one file per data disk. When you create a file with either program, you're warned it will erase everything on the disk and asked to verify before it proceeds.

Both of these systems need only one disk drive (all programs run on DOS 3.3), but both have their own require-

ments when it comes to hardware. List Handler, for instance, boasts it can have up to eight disk drives on line at any one time. This isn't a bad idea, perhaps, but doesn't make economic sense (you'd buy a hard disk instead). While PFS: File has a built-in function that will either copy your entire data disk or just the design of your form, you need two disk drives to do so.

A PFS: File data disk can hold up to 1000 forms, depending on their complexity and the number of characters you enter on each. With a form that has six headings and 150 characters of data, you'll be able to store about 650 records. This program also allows you to position your information on the screen exactly where you'd like it to be. Both List Handler and Quick File keep your information in a sequential list format—you start with field #1, find field #2 directly below, and so on. PFS: File gives you much more flexibility in terms of on-screen design than either of the other two packages.

Quick File runs only on the Apple //e. This system requires two disk drives. While Quick File allows more than one file per disk (up to 26), the size of the files it can work with is limited by the amount of memory your Apple //e has. Assuming an average record size of 75 characters and a standard 64K //e, you're allowed only 140 records per file. If you have an extended 80-column text card and its additional 64K of memory, each file can hold about 600 records. In any case, Quick File allows 15 categories (fields) per file, and a maximum of 1140 characters of information in each individual record (probably enough for most applications).

List Handler lets you have about

200 characters per data field, with as many as 255 fields per record. In total, each individual record can have roughly 4000 characters of information (the letter G is one character). While List Handler boasts that up to 3000 records can be stored on each data disk, the manual is vague about how you can convert expected record length into precise disk space requirements. If you extrapolate the information in the manual, it appears that List Handler can store about the same per data disk as PFS: File can.

List Handler's records can range over multiple pages (as all three programs can). This system comes to your business with a surprising feature, and one neither of the other two packages claim: the capability to span multiple disks with the same file. If your warranty record file grows too large, you simply extend it onto another disk. Still bigger? Extend it onto yet another disk, and so on.

Documentation

List Handler's 73-page manual lacks an index but gets you started fast, right where you'd expect: You create a new file. Since this system is designed to work with lists of information, your screen displays your data in sequential order: The first field of information is shown at the top of your screen, followed by the second field, then the third, and so on.

The manual is written as a tutorial, and the system comes with sample files on disk for you to practice with. You logically move from learning how to add new data into your newly-created file to how to search through it.

While you can interface List Han-

Greg Glau compares for you at P.O. Box 1627, Prescott, AZ 86302.

by Gregory R. Glau

"You learn in a logical manner."

dler with other programs (especially Word Handler, a text-handling system put out by the same company), the program is geared to function as a mailing label generator. You can, however, create your own form letters within List Handler without having to use an outside word processor, and pull List Handler data from disk and insert it into your letters. The system won't let you save the letters or print formats you create, though.

PFS: File comes with an indexed manual (96 pages) that's filled with screen pictures and good advice. The program itself is very friendly, and since you use its menus to run the system, you'll pick up its operation rapidly. You learn in a logical manner by starting with file creation, then move on to how to properly add new information, how to search for data, and finally, how to print your files. A corresponding program called PFS: Report (\$125) gives you the power to create more complex form designs, do math on your fields, and so on. It isn't covered here, as then the total price for the PFS: package would be way out of line in relation to the others, but you should know that it is available to make PFS: File more complete and powerful as your needs change.

Quick File's 158-page manual is also indexed and logically arranged. Since it's considerably longer than the manuals for either List Handler or PFS: File, you might expect the program to be much more complex. On the contrary, Quick File is easy to learn and fast to start using. You're told what the program can do, given an overview as to how it functions, and then head right into using the sample files that come on disk with the system.

Searching and Sorting

All three packages boast an impressive array of searching capabilities that run from the obvious (EQUAL TO, GREATER THAN, LESS THAN) to the powerful (search for a RANGE of dates, find a PARTIAL MATCH). Quick File gives you a couple of unique search patterns. It can look for a BLANK/NOT BLANK entry in your files. You might have a situation where you want to indicate if someone's paid (at least something) on

their outstanding account balance; Quick File can determine if that particular field is empty or not. It also will examine your entries to see if they BEGIN WITH or END WITH a specific character string you need to find.

List Handler has the weakest search function of the three programs, in that you're allowed to search on only one data item at a time. In other words, you can only have one search condition, can only ask the program to look for one item. It partly overcomes this by allowing you to compare your search item with the data in one field or with the information in all your fields, but still doesn't let you link search conditions together, so you can look for more than one item each time you initiate a search. The people who produce List Handler promise a new utility disk that should be available by the time you read this, to allow multiple search patterns and math inside your data fields—as of this writing, the two weakest areas of this program.

Both PFS: File and Quick File let you design multiple search patterns, but they handle things differently.

With PFS: File, you simply use a blank on-screen form to indicate what you want to match. You're allowed "wild card" entries here, which will find only a partial match. While you can ask PFS: File to do a NOT search (retrieve the form if this item is *not* a specific thing), there is no OR search capability. You can't ask PFS: File to look for this or this or this.

Quick File, however, does allow an OR search, and while the procedure you use to set your search conditions is more complex than either of the other two programs, it's more powerful and complete.

All three programs can sort your data so it will print in the sequence your business needs. However, because of the way PFS: File treats numbers, it can't do an accurate numeric sort on numbers of different lengths.

Merge and Change

Since we often forget to put in all the data fields we need when we first design our records, it's necessary to have some way to add extra fields, even after we have a file created and data entered into it. It's also often helpful to merge the data (or part of it, anyway) from one file with that of another.

All three of these programs let you add new fields to your files, even after data has been put into them. When you change any Quick File field names, all associated report formats are deleted from the data disk, as they're no longer valid (some of the names they report on won't exist any longer).

PFS: File is the only one that lets you merge information from one file to another. PFS: File also lets you split off part of a file onto another disk, in case it grows larger than the disk's capacity. You need two disk drives for either of these functions.

PFS: File constantly displays the percentage of space you've used on the disk you're working with, while Quick File reports how many more records you're allowed in the current file. List Handler doesn't advise of available space.

Program Quirks

One of the hardest things to get used to with PFS: File is that you use control-C to indicate to the program that you've finished with whatever you're doing at a particular time. We're so used to pressing return that it takes a bit of practice to get out of the habit. Also, if you do press the more normal return instead of control-C, the cursor sometimes positions itself just sort of here or there, like it has a mind of its own.

Quick File is unique among these systems in that you have constant access to on-screen help. As with many programs, what you see is basically a summary of the information in the manual, but it's still handy to have it available at the press of a couple of keys. Quick File is also the only one of these three packages that can do math on its fields, to compute things like totals and subtotals. As noted, PFS: Report can interface with PFS: File to give it math functions (and other helpful power), but at additional expense. And, List Handler is sup-

posed to have math capability in its latest version (not available as this was written).

List Handler is the only program of the three that can use the data interchange format (DIF), which lets you create worksheets with (for example) VisiCalc and then transfer their data to List Handler. This program also produces its own upper- and lowercase characters, so you can get more information on your screen than you do with a standard Apple 40-character display. The characters are surprisingly good, too.

PFS: File uses only uppercase characters and cannot use an 80-column card if you have one in your Apple, although (as noted) the version of the package for the Apple IIe will use its 80-column card and special keys.

Quick File is designed for the Apple IIe and its upper- and lowercase display. This system is the most powerful of the three programs, and often seems to think for you as you use it. All date entries are automatically put into the same format (3/17/99 becomes MAR 17 99 to the program). If you don't enter part of a date the program inserts zeros, to keep it in a standard form (10/99 becomes OCT 00 99). Even times of day are standardized based on a business day; an entry of 8 becomes 8:00 AM instead of 8:00 PM, because businesses are open and operating then. You can override the time formats, if you wish.

Quick File will interface with Apple Writer IIe so you can put your Quick File data into your word processing output. This system also has a unique zoom function, which lets you examine a number of records on your screen, or zoom in and focus on just one of them.

Reports

In addition to finding the information you need from your data (using the SEARCH capability of a program), the other vital thing about any information handling system is its ability to create helpful and understandable reports for you. Quick File is without a doubt the strongest program here, primarily because it can do math on its fields. As noted, you can buy a program (PFS: Report) that works with PFS: File to give you this same power,

but then you've spent two and a half times the price of Quick File.

Quick File reports are easy to create; you're constantly informed how wide they'll be if you add a field. You simply tell the program exactly what you want to print, and where you'd like it to end up on the paper. The reports you can create with PFS: File are even simpler to design, although without the math capabilities. Both Quick File and PFS: File let you create and then save your print specifications for use at a future time. List Handler lets you design report formats, but cannot save them for you.

Many of the printers on the market today can print in bold type or emphasized print, or even with extra-large characters. Of these three programs, only List Handler doesn't allow you to send control codes to your printer to set up the conditions you want. However, while Quick File lets you enter the codes directly from inside it, PFS: File forces you to use a BASIC program (supplied) to do the same. Both PFS: File and Quick File insist your printer be located in slot 1; List Handler lets you change this location.

Weaknesses

Not one of these programs provides any kind of entry checking for your information, so you can insist that a certain field be a specific length, or that the operator enters only a Y or N answer, or that the data is in an exact format (like a social security number). No field lengths are specified, which makes file design easy, but often can cause problems later on as an operator can enter about anything he or she wants. With PFS: File's standard version, for example, the only limitation is when your entry bumps into the right edge of the screen. Since List Handler uses its own character set, you're allowed three 66-character lines for each data field (less the length of the field name itself).

While the manual for Quick File is thorough and generally interesting, all displays are shown in the 80-column format. If you didn't buy an 80-column card with your Apple IIe, your screen displays will differ from those in the manual.

Both List Handler and PFS: File come with copy protected disks; Quick File's disks are copyable.

What to Buy

List Handler is the least expensive and is specifically designed to work with lists of data (mailing labels are an ideal use). If you want to get started with file management for the least outlay of cash and your work is such that a single-item search will do what you need it to, List Handler will serve you well. Once the extra disk that lets you do math and conduct more complex searches is available, this program will be even more valuable. That's also true if you see a need to interface with a system (perhaps one you already own) through the use of data interchange format (DIF) files, or if you need to store good-sized blocks of textual information.

If you own an Apple IIe, Quick File may seem the obvious choice. It's simply more powerful than the other two programs. But there's a caveat here: It's not as easy to use, nor as friendly as, say, PFS: File. If you, or whoever in your office will use the program, wants the easiest and simplest method to handle your business data, then PFS: File is a strong contender, whichever Apple you own. Perhaps it's more of a feeling than anything else, but PFS: File gives you something I'd call friendly power. ■

List Handler

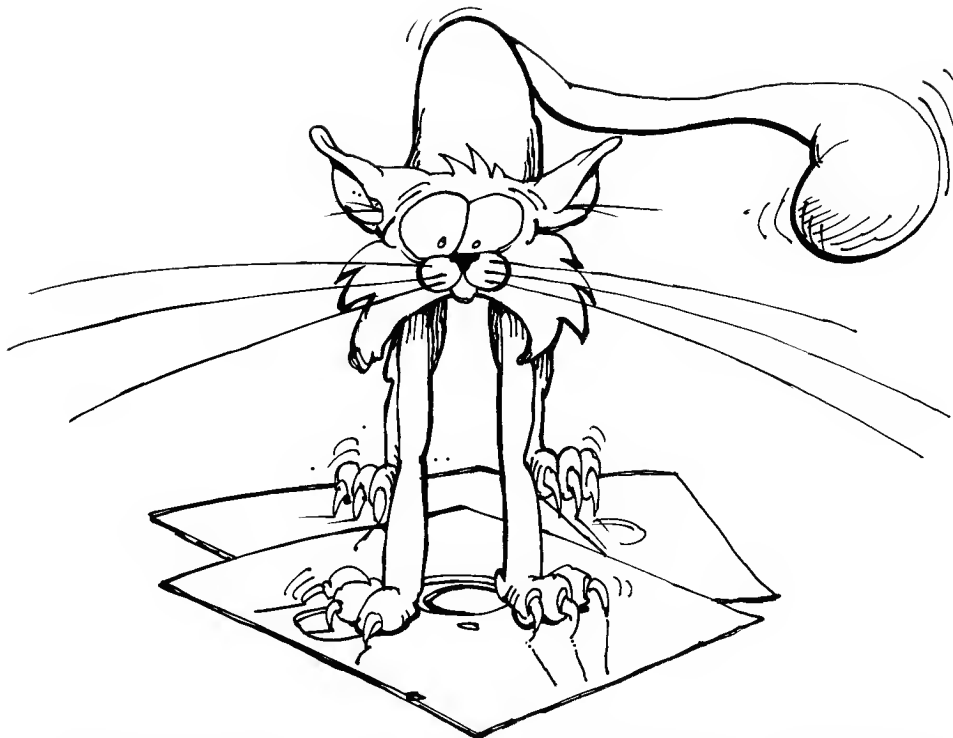
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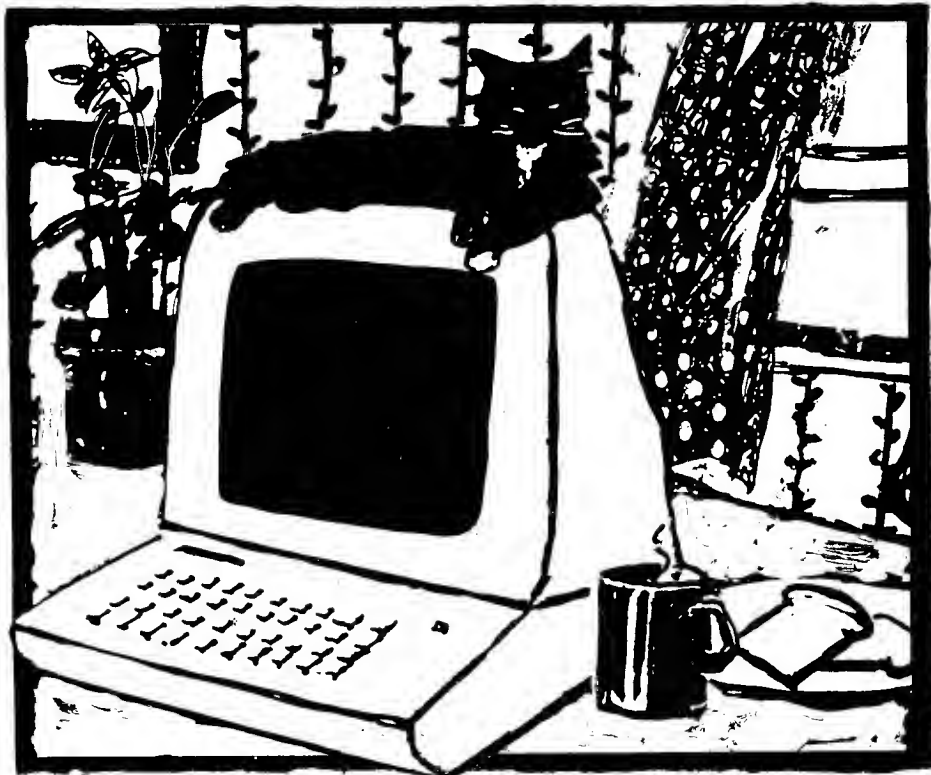
Productivity: The Name of the Game

Welcome to the world of productivity, the real world, where your computer must perform at its best. In the coming months I'll be discussing ways to get the most out of your Apple II family (or compatible) machine for the money you spend. We'll wage a small war down in the trenches to wrest maximum working benefit from a sometimes stubborn, sometimes unpredictable, sometimes downright ornery—but nonetheless excellent piece of equipment.

This isn't going to be a "business" column, per se, although it won't ignore business applications. Nor will it be strictly a "home" computer column. It will cover business and home, work and pleasure. The column will be a clearinghouse for as much software and hardware as I can, with the manufacturers' help, get my hands on.

I will address new owners, but at the same time keep those who've owned their machines for some time in mind.

There will be a blend of DOS and ProDOS. Price will mean nothing. I'll not be seeking out inexpensive semi-solutions solely because you can cut a corner and do extra work to save a buck, although they won't be passed over either. The more expensive solutions usually cost more for a reason. They are generally the end-product of a considerable development effort, and their price reflects it. And sometimes the components that mesh together to form the product are expensive.



I promise you I will be brutal. Those of you who read my pseudo-infamous word processing round-up in the old "Ill's Company" column know what I mean. I will be honest about any software or hardware that I try—and only those I try. There will be no advertising filler.

Help Wanted!

I expect to hear from all of you who have had success or failure with a product, and considering the sales figures for Apple computers that should be quite a number. For example, I want to hear from department heads who are using VisiCalc. If you're using any of the other "Visi-" products with the same data and exchanging it in either DIF or ASCII format and it works, I'd like to know. If you're getting bogged down in "glitches," tell me that, too. And I want to hear from those of you who work for those department heads

and have found a better way of doing things that they won't listen to.

Also, what are you doing with your machine at home? Is it really producing for you, or has it been relegated to the kids for amusement? I don't care if you're running an application on an Apple II, II Plus or IIe, a Franklin, a Pinecom or a Basis 108. If what you're doing works, I want to hear from you. Include the name of the product, the company that makes it, where you bought it, the retail price and the price you paid for it (if they differ).

If you have something that *doesn't* work, I *really* want to hear from you. But it gets more difficult. We all have off days when no matter what we try or how we try it, everything turns out lousy. There has to be some way to filter out that type of experience. If

Send your questions, comments and "Journal" input to Bill O'Brien, P.O. Box 1010A, Fort Lee, NJ 07024.

by Bill O'Brien

what you have doesn't work, you're going to have to document it. In addition to the who, what, where and how-much information, include the circumstances in which it doesn't work, whether it never works or if the problem occurs just with specific hardware, and the people *at the manufacturing or sales level* you've spoken to.

You might include copies of any correspondence relevant to the issue, and addresses and phone numbers if they apply. If I report that a product is bad, I will make sure there is sufficient documentation on hand to verify that verdict.

Credentials

What, you may ask, gives *me* the right to propose such an undertaking. Well, let me count the ways. I've been involved with computers since 1978—no great span of time, but large in the history of small computers. I've owned and borrowed various machines and peripherals, and have altered and added to them to create systems to my liking.

At one time I was the manager of one of the New York City Computer-Land stores. After that I worked for a New York City computer consulting firm, advising clients on prospective computer purchases. In that capacity I refused to blindly recommend any brand of computer, even the one the company represented, until I found out what the client needed, and I think I gained some respect.

During that time I authored the "III's Company" series for *inCider*, a few things for another Apple magazine, and some material about IBM PC's. (They're not really the competition.) Now I have moved out on my own. I'm writing two books, one on the Macintosh and the other on the //c, and I continue to do consulting.

I am brash, bold, daring, outspoken, and have an ease of manner that allows me to move my foot in and out of my mouth with equal grace. With qualifications like that, how can I go wrong?

Modus Vivendi

I should welcome you to Futility Base, where I do some of my best, and worst, work. It's constantly in a state of flux; things appear and dis-

appear with irregular regularity.

The current cast of characters includes Spock, my Apple ///, and Savik, the /// Plus I have on loan. There are my Macintosh, Scotty, a marvel of technical wizardry, and, of course, my Apple //e, Bones—just a simple country computer but the flagship of the fleet. (Do you get a hint at my personal tastes?)

My IBM PC is called Chekov because it claims that where it came from *everything* came from and anything said was said there first. In a corner sits the working remains of a Commodore 8032, and somewhere in a closet are 8050 disk drives for it—they fade in and out of temporal space. A variety of monitors also inhabits the place, as well as a variety of printers.

As I indicated, I'll deal in my "Journal" only with the Apple II family. As it's set up right now my //e system includes the new DuoDisks, an extended 80-column card, Apple's PIC (parallel interface card), a Super Serial Card, an Amdek 300A monitor, and access to either an Imagewriter, a ProWriter, or a NEC 2050. In the coming months I'll be trying other printers, monitors, RAM disks, co-processors, plotters, graphic input devices, as well as a host of software.

Let me emphasize that your particular system configuration need not be mine. You won't have to go out and buy anything more than what you have already—unless what you already have isn't doing the job for you.

A Definition

To do anything effectively we'll need a working definition of what is productive. I am defining it as the match between the time needed to do a job with the tools you have, and the time you actually can afford. If the collection of hardware and software you apply to any particular task allows you to complete it in the time allowed, then you are being productive. If it doesn't meet expectations, then you need to re-evaluate what you are using.

To score well on productivity a program must be simple to operate. If you have to stand on one foot while reciting the Four Great Mantras and

waving a dead chicken over your head, it won't do. On the other hand, if you can slip into it like an old jalopy, put it into gear and go, you know you have a winner.

A Sample Problem

Say you're running a mailing list on an Apple II (and we'll use that designation to include the entire Apple II family unless specifically noted otherwise). In the months since you purchased the machine your list has grown to the point where it's straining the capacity of the disk drive. Not only that, but the access time to search from the beginning to the end of the file for a particular name is incredibly long.

You could sell the Apple II and purchase a larger system that runs faster and has more disk storage ability. But aren't there less drastic alternatives? Are there, for instance, alternatives to the disk storage you are now using? Yes, indeed! MicroSci and Rana, for example, supply larger-capacity floppy disk drives—and that's not even touching on the possibility of a hard disk drive.

As for running slowly, that's inherent in the Apple II. The 6502 is a very good number cruncher, but it doesn't excel in the input/output department. And the basic Apple II operating speed of 1 MHz has remained unchanged over the years.

Switching to a Softcard, the CP/M/Z-80 processor board, would almost double your machine's speed. You'd be faced with re-entering your data, though, because Applesoft programs and CP/M are not compatible.

There *are* other co-processors. The Accelerator from Syntex, for example, boasts compatibility with nearly all Apple software and provides a remarkable increase in machine speed.

If the program that is managing the disk access is inefficient, you can get a new program. It, too, would mean re-entering all of the data, but the increased speed might be worth the effort.

Another approach could solve both the speed and capacity problems at once—a RAM disk. These are random access memory boards with software that makes them look to

DOS like extremely high-speed disk drives.

There are drawbacks, however. If the power goes off, or dips below a useable level, you lose what you have in a RAM disk if it doesn't have battery back-up. Whether that's a necessary consideration or not will depend on your area. (For a discussion of how to run an Apple off a battery, see "The Alternative Apple" in the February 1984 *inCider*.)

Word-of-the-Month

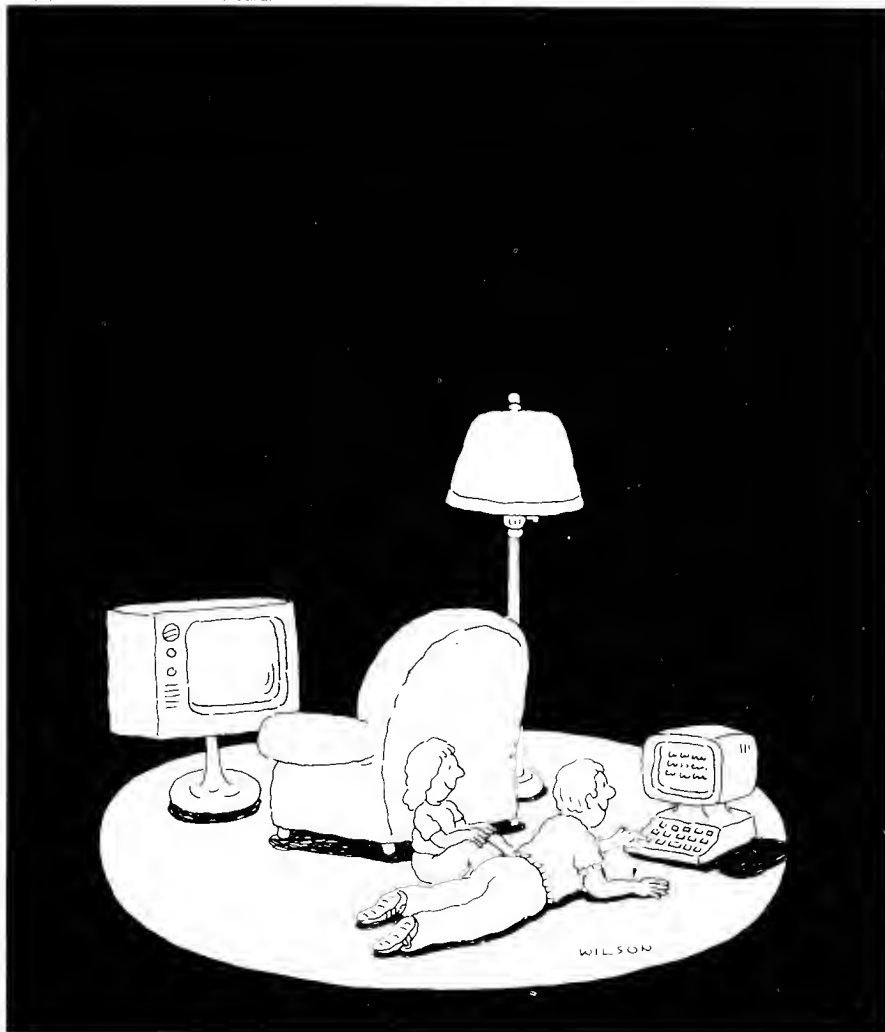
You probably know by now that there is a mouse for the Apple //e (like MacMouse and Lisa Mouse), and a mouse-operated graphics package by Bill Budge, called MousePaint, accompanying it. MousePaint emulates MacPaint, the graphics program for the Macintosh.

The initial expense of the mouse (they throw the program in for free) may not warrant purchase until there are more programs available. Also, my initial reaction to MousePaint is not favorable, although I'm not totally displeased. There are some rough spots in it and I think more attention should have been given to producing quality graphics than to producing graphics that look like MacPaint. If that were what I wanted, I would have bought a Macintosh. I'll go into this more next month and I'll waive final judgment until I see some of the other graphics utilities (Graphics Magician and DSR, for instance).

By next month I should have a Quadjet color inkjet printer up and running at Futility Base. The folks at Quadram assure me that it's a snap both to install and use. Arriving at about the same time will be Visi-Everything—not a new product from Visicorp, but just *everything* they've ever done that will run on a //e. I'll have some comments on both.

Now I've got to go. I have a four-legged research assistant who tries to digest as much of the material as she can before giving it to me. She just walked by with a copy of the AppleWorks manual in her mouth, and I haven't had a chance to read it yet!

Until next month then, enjoy and be well, and remember, Apple II forever! ■



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Educational Computing at Home

My son isn't even two years old yet and his favorite pastime is playing educational games on the computer. Of course, he has to fight Melody, my four-year-old, for time at the keyboard. Kids are learning to use a computer before they can even talk these days.

This column will address the question of what you, as a parent, can do to help your child get a better education by using a computer at home. The age span covered will range from preschool to high school.

What to Buy?

When I was in the retail software business, I often received calls from people who ordered business programs, a couple of the latest games, and then, almost as an afterthought, something educational for their children. Buying educational software seemed to soothe their guilty conscience for spending so much on their computer.

At that time, there was not much educational software to choose from,

but now there is such a proliferation, it's difficult to know what to choose. How can you decide when almost every major educational publisher, including well-known firms such as SRA, Reader's Digest, McGraw-Hill, and Holt, has its own educational software line?

To find out what's the latest, you can visit your local dealer, but unfortunately, many dealers don't carry much educational software and then

Dr. Fred Huntington has spent 17 years in education, five as a school principal. He has a master's degree in Education and a doctorate in Human Behavior and Leadership. His experience also includes four-and-a-half intensive years with an Apple computer and as owner/president of an educational software company. Two pre-schoolers and two teenagers in his family give him the opportunity to try out new software. Currently he is writing a book on educational administration, as well as the "Learning Machine" column for inCider.



by Fred Huntington

can't tell you much about what they do have. If you wanted to thoroughly evaluate educational software, it would take most of your waking hours. There has to be a reasonable way to make a selection.

What Are Your Child's Needs?

The first thing you have to decide is what are your child's needs? It sounds simple, but most parents skip this essential step. If your goal is to help your child do better in school, then you don't want to just keep him or her busy on the computer. Determine if you want to use the computer for

"It sounds simple, but most parents skip this essential step."

enrichment or for remedial help. Remedial help can give a child an extra boost in the areas where he or she is behind. Enrichment teaches a child to reason and use higher levels of thinking skills. Limit the area you wish to concentrate on. Don't

think you can solve all of your child's problems at once.

Perhaps you want to buy software for remedial purposes. You must determine the areas of specific need such as multiplication facts, speed reading, or typing. Check with your child's teacher first for any recommendations.

What Can You Do?

We'll pretend your child is in the fifth grade and the teacher says he or she needs work on the multiplication facts. Now what do you do? You could go down to your local dealer

Sources of Educational Software Catalogs

Publishers

Hartley Courseware, Inc.
P.O. Box 419
Dimondale, MI 48821
(517) 646-6458
Excellent educational software.

Educational Activities, Inc.
P.O. Box 392
Freeport, NY 11520

Aquarius
P.O. Box 128
Indian Rocks Beach, FL 33535
(813) 595-7890

Sunburst Communications
Room Y N 8
39 Washington Avenue
Pleasantville, NY 10570
(800) 431-1934

School and Home CourseWare, Inc.
Dept. 930
1341 Bulldog Lane
Fresno, CA 93710

SVE
Dept. HB
1345 Diversey Parkway
Chicago, IL 60614

SRA
P.O. Box 5380
Chicago, IL 60680-5380
(800) 621-0476

Random House School Division
400 Hahn Road
Westminster, MD 21157
(800) 241-9489

Micro Learningware
P.O. Box 307
Mankato, MN 56002-0307
(507) 625-2205

Xerox Computer Software Division
245 Long Hill Road
Middleton, CT 06457
(800) 852-5000

Retailers

Strictly Software
P.O. Box 338
Grantville, OH 43023
(800) 848-5253
One of the few discounters specializing in educational software.

Follett Library Book Co.
4506 Northwest Highway
Crystal Lake, IL 60014
(800) 435-6170
Huge comprehensive catalog.

GAMCO Industries, Inc.
P.O. Box 310L
Big Spring, TX 79721
(800) 351-1404
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The Perfection Form Co.
1000 North Second Avenue
Logan, IA 51546
(800) 831-4190

GW School Supply
5626 East Belmont Avenue
Fresno, CA 93727-2797
(209) 251-6026
A good company.

American Micro Media
P.O. Box 306
Red Hook, NY 12571
(914) 758-5567

Charles Clark Co., Inc.
168 Express Drive South
Brentwood, NY 11717
(516) 231-1220
A huge catalog that is well done.

The Home Software Guild
P.O. Box 2031
Nashua, NH 03061-2031
(800) 227-1929
Not educational specialists, but a catalog worth getting.

Opportunities For Learning, Inc.
8950 Lurline Avenue, Dept. K1
Chatsworth, CA 91311
(818) 341-2535

K-12 Micro Media
172 Broadway
Woodcliff Lake, NJ 07675
(201) 391-7555

Education Plus
18584 Carlwyn Drive
Castro Valley, CA 94546
(415) 582-8252

Cole Supply
P.O. Box 1717
Pasadena, TX 77501
(713) 944-2345

Island Software
Box 300, Dept. K
Lake Grove, NY 11755

AIMS Media
626 Justin Avenue
Glendale, CA 91201-2398
(800) 367-2467

School Specialty Supply, Inc.
P.O. Box 1327
Salina, KS 67402-1327
(800) 255-0004

Learning Arts
P.O. Box 179
Wichita, KS 67201
(316) 682-6594

United Media Enterprises
The World Almanac Education Division
1278 W. Ninth Street
Cleveland, OH 44113
(800) 521-6600

and say, "I want a highly motivating Apple program to teach the times tables to my fifth grader."

Many dealers will say, "I've got just the thing for you. I can order it and have it in a week or two." Then you find out that not only must you pay full list price, but if you don't like it, there are no returns. Not every dealer will treat you this way, but many will.

Obviously, you don't want to spend \$30 to \$50 on untried software that may or may not be good. So what do you do next? You start leafing through old computer magazines for educational software reviews. Unfortunately, you don't find many.

Your next step is to call your child's school and ask for the resident computer expert. Chances are, there will be an unofficial, acknowledged computer expert among the faculty who will tell you more than any dealer can, or at least tell you where to get help.

Good Sources

Don't overlook the county departments of education, since many sponsor software viewing centers. While designed for teachers and administrators, the centers may be open to the public. If not, they should at least tell you which software is good and which is bad.

You can subscribe to computer magazines that deal just with education. Listed in this article are a few educational computing magazines that might offer good home applications. I have left out magazines that focus only on schools.

Of the publications that specialize in reviewing software for the Apple, the best I've seen is *The Digest of Software Reviews: Education*, with condensations of reviews from 75 periodicals. One program may have seven or more reviews in capsule form from various magazines. Each issue contains approximately 200 reviews of 50 selected programs. It is edited by the highly-respected Ann Lathrop. The price for this quarterly is \$52.95 per year, including binder and tabs. For a sample copy send \$10 to: *The Digest of Software Reviews: Education*, c/o School and Home CourseWare, Inc., 1341 Bull-

dog Lane, Suite C, Fresno, CA 93710.

If you don't want to go through the trouble of tracking down reviews, just thumb through *inCider* and look at the ads from discounters selling computer software. Most of these discount mail order dealers have toll-free telephone numbers you can call. Some, such as Strictly Software, even specialize in educational software. Call each one and ask what they recommend for a fifth grade student having trouble with the times tables. You'll get a lot of uneducated guesses, and dealers who won't even talk to you. But, somewhere you'll find a source willing to work with you and willing to help you solve your problems.

Service as well as price is very important. Will you be able to return a program that might be too easy for your child for a modest restocking fee? Do they take credit cards? What happens if the program is defective?

If you purchase software by mail order, it is essential that you use MasterCard or Visa. That way, if something goes wrong and the com-

pany won't cooperate with you, all you have to do is send the credit card company copies of all correspondence and the invoice and ask them to take the charge off your bill. They will—without question. It's the best consumer protection I know.

Collect Catalogs

Become an avid catalog collector. In a recent issue of *inCider*, I counted 24 potential software/hardware catalogs you can get for free simply by circling the appropriate numbers on the reader response card.

Also included in this article is a listing of where you can write for the educational catalogs I receive free as a school principal. I've divided them into two groups. The first sends out catalogs of their products and the second lists retailers.

Don't be overwhelmed by the amount of educational software available for the Apple. Read magazines and books. Talk to your local educators and dealers. Someone might even come out with an Apple program that will help you choose software.

Educational Computing Magazines with Applicability to Home Use

Family Computing

P.O. Box 2512
Boulder, CO 80321
\$15.97 per year
Covers how to use the computer at home.

Classroom Computer Learning

5615 W. Cermak Road
Cicero, IL 60650
\$15.95 per year
Aimed at schools, but has good reviews of educational software.

Electronic Learning

Scholastic, Inc.
P.O. Box 645
Lyndhurst, NJ 07071-9986
\$19 per year
Basically for school administrators, but contains many excellent reviews and sound basic computer information.

Family Learning

5615 W. Cermak Road
Cicero, IL 60650
\$9.95 per year (charter price)
A new magazine that is billed "for parents who want to make a difference in their children's education." Not a computer magazine, but it does cover computers.

Software Pick of the Month

Each month I'll be spotlighting a program that I particularly like. This month, I want to tell you about Stickybear ABC, an alphabet game from Xerox. Written by Richard Hefter, Janie and Steve Worthington, and Spencer Howe, Stickybear ABC has a list price of \$39.95 but you can find it advertised in *inCider* for \$30, including shipping.

Stickybear is promoted for children three to six. My son, Dale, however, is twenty-one months old and has spent several months and many hours playing this delightful game.

Stickybear ABC is exceedingly easy to use. Press any letter and something happens. For example, if you press H an animated, noisy helicopter flies back and forth across the screen until you press another letter.

Each featured letter has two representative alternating pictures. My favorite letter is S, because it's the only one that doesn't have music or sound effects. If my daughter, Melody, tires of playing ABC but plans to

**"Press any letter
and something
happens."**

come back later, she knows that Daddy likes her to leave the screen displaying softly falling snow.

All the graphics are hi-res and well done. Even Mom and Dad will spend some time with Stickybear. It's just plain fun.

An attractive alphabet poster comes with Stickybear ABC along with a hard-bound book called *The Look Book*, which teaches children picture and word recognition. The book contains labeled and unlabeled objects for children to identify in familiar settings such as a toy store, supermarket, furniture store, bakery, clothing store, garage, and home.

The packaging is colorful and enticing enough to even attract adults. If you buy your preschooler just one program, make this one it. Other

packages in the series include Stickybear Bop, and Stickybear Numbers.

A similar game, no longer state-of-the-art, but nonetheless fun, is Hodge Podge from Artworx and Dynacomp. Hodge Podge does basically the same thing as Stickybear ABC but in lo-res graphics with much less sound, only one picture for each letter, and none of the frills mentioned above. It costs only \$21.95, but may be harder to find.

Have a Question?

Got a program you want to know more about or a question that needs answering? Write to me, and I'll respond in the question and answer section I plan to include in every column. Here's my address:

Dr. Fred Huntington
P.O. Box 787
Corcoran, CA 93212

I won't be able to make personal replies, but I'll put as many as possible in the column. Thanks for reading!■

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Munch Mouse



In Munch Mouse, the player helps a little white mouse named Munchy find its way through a series of mazes while eating bits of Swiss cheese. Although the game may seem as mindless as other dot munching maze games, it teaches some important lessons to children just beginning to use a computer.

Very small children may have an interest in computers, but may not have the letter and number recognition skills needed for the software. Commercial software teaches shape recognition or drawing, but requires that the child use the keyboard or some other input device. Not all children are ready to interact with a computer in that way.

Munch Mouse is fun for these children. It gives them a chance to play with the computer and to meet and help a friendly mouse. More important, Munch Mouse teaches them

that computers obey people, even little people. It also teaches them to plan ahead and helps them to learn the keyboard, one key at a time.

The Program

To type in Munch Mouse, clear your computer by typing NEW. Then type in the BASIC program in **Listing 1**. Save it to disk with SAVE MUNCH MOUSE. Then type in the shape table in **Listing 2**. Get into machine language by typing CALL

Introduce your young ones to Munchy, the little mouse who loves to find cheese.

Write to Michael Seeds at Franklin and Marshall College, P.O. Box 3003, Lancaster, PA 17604.

by Michael A. Seeds

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C. Itoh Prowriter 2, (136 col).....	589.88
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Mannesmann Tally Spirit-80.....	329.88
Memotech DMX-80.....	339.88
Okidata Microline 82A/83A.....	CALL
Okidata Microline 84 Step II.....	CALL
Okidata Microline 92.....	CALL
Okidata Microline 93.....	CALL
92/93/84 Plug-n-Play ROMs for graphic compatibility with IBM-PC.....	CALL
Panasonic 1090.....	339.88
Star Micronics Gemini 10X.....	299.88
Star Micronics Gemini 15X.....	419.88
Star Micronics Delta 10.....	439.88
Star Micronics Delta 15.....	589.88
Star Micronics Radix 10/15.....	CALL
Toshiba P-1351.....	1689.88
Toshiba P-1351 Tractor.....	169.88

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C. Itoh A-10 Starwriter (18 cps).....	\$ 549.88
C. Itoh F-10 Starwriter (40 cps).....	1079.88
C. Itoh F-10 Printmaster (55 cps).....	1379.88
Comrex Series Printers.....	CALL
Diablo Series Printers.....	CALL
NEC 2010/2030 (18 cps).....	749.88
NEC 3530 (33 cps).....	1429.88
NEC 3550 for IBM-PC (33 cps).....	1779.88
NEC 7730 (50 cps).....	1939.88
Qume Series Printers.....	CALL
Silver Reed EXP-770 (25 cps).....	979.88
Silver Reed EXP-550 (17 cps).....	559.88

Silver Reed EXP-500 (12 cps).....	439.88
Smith Corona Memory Correct III Messenger (12 cps) w/interface module.....	589.88
Star Micronics PowerType (18 cps)....	CALL

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- 151, and you will see the machine language prompt *. Type the shape table, using a colon after the starting address instead of a dash.

You could enter all of the two digit hex commands before pressing return, but if you make a typing error, the computer will probably ignore all of the commands that follow. It is better to type two or three lines of commands and then press return. Begin again with the appropriate address, 4028: for example (be sure to

type in a colon after each new address), and then continue typing hex commands. When you have typed in the entire table, you can list it by typing 4000.404D. Save it to disk with BSAVE MOUSE, A\$4000,L\$4E. Now you are ready to run Munch Mouse.

Playing the Game

When your child plays Munch Mouse he or she will see a white mouse, Munchy, and four pieces of cheese. (Adjust the color to make the cheese

Listing 1. Munch Mouse program.

```

100 REM *** MUNCH MOUSE ***
110 REM *** BY ***
120 REM *** MIKE SEEDS ***
130 REM
140 GOTO 500
300 FOR JJ = 1 TO 70: NEXT JJ: RETURN

400 SX = PEEK (49200) + PEEK (49
200) + PEEK (49200): RETURN

500 SX(1) = 248: SX(2) = 248: SX(3) =
139: SX(4) = 31
510 SY(1) = 19: SY(2) = 171: SY(3) =
95: SY(4) = 171
1000 S = 0: FOR J = 1 TO 20: S = S +
PEEK (16383 + J): NEXT J: IF
S = 845 THEN 1020
1010 PRINT CHR$(4); "BLOAD MOUSE
"
1020 POKE 232,0: POKE 233,64
1030 HOME: SC = 0: SCALE = 1: ROT =
32: GOSUB 6000
1040 ST = 1: X = NX: Y = NY: ROT = R
1100 POKE 49168,0: REM CLEAR KB
STROBE
1198 REM
1199 REM ***MAIN LOOP***
1200 A = PEEK (49152): REM PEEK
KB
1210 IF A < 128 THEN 1300
1220 A = A - 128: POKE 49168,1
1230 IF A = 73 THEN DY = - ST: DX
= 0: R = 48
1240 IF A = 74 THEN DX = - ST: DY
= 0: R = 32
1250 IF A = 75 THEN DX = ST: DY =
0: R = 0
1260 IF A = 77 THEN DY = ST: DX =
0: R = 16
1270 IF A = 32 THEN DX = 0: DY = 0

1280 IF A = 27 THEN HOME: TEXT
: END
1290 IF A = 19 THEN GOSUB 7000
1300 NX = X + DX: NY = Y + DY
1310 XDRAW 2 AT X,Y: REM ERASE
1320 ROT = R
1330 XDRAW 2 AT NX,NY: REM DRAW
1340 IF PEEK (234) < > 87 THEN
GOSUB 5000
1350 IF SU = 0 THEN GOSUB 6000
1360 X = NX: Y = NY: RO = R: GOTO 12
00
1370 REM ***END MAIN LOOP***
1390 REM
4990 REM
4999 REM SUBROUTINE COLLISION
5000 IX = 0
5010 FOR J = 1 TO 4
5015 CY = 0: CX = 0
5020 IF ABS (NX - SX(J)) < 14 THEN
CX = J
5030 IF ABS (NY - SY(J)) < 11 THEN
CY = J
5040 IF CX * CY < > 0 THEN IX =
J: J = 4
5050 NEXT J
5055 IF IX < > 0 THEN 5200
5059 REM
5060 REM WE'VE HIT A WALL
5070 XDRAW 2 AT NX,NY: REM ERASE

5075 GOSUB 400
5080 DX = 0: DY = 0: ROT = RO: R = RO
: REM STOP
5090 XDRAW 2 AT X,Y: REM DRAW
5100 NX = X: NY = Y: RETURN
5190 REM
5200 REM WE'VE HIT CHEESE!
5205 FOR K = 1 TO 4: GOSUB 400: GOSUB
300: NEXT K
5210 ROT = 0: XDRAW 1 AT SX(IX),SY
(IX): REM ERASE
5220 ROT = R: SU = SU - 1: RETURN
5990 REM
5999 REM SUBROUTINE DRAW MAZE
6000 SC = SC + 1: IF SC = 5 THEN S
C = 1: RESTORE
6005 HGR: POKE 49234,0: HCOLOR =
3
6008 HPLLOT 0,0 TO 279,0 TO 279,19
0 TO 0,190 TO 0,0
6010 READ NN: IF NN = 0 THEN 6100

6020 READ X,Y: HPLLOT X,Y
6030 FOR N = 2 TO NN: READ X,Y: HPLLOT
TO X,Y: NEXT N
6040 GOTO 6010
6100 REM DRAW CHEESES
6105 ROT = 0
6110 FOR J = 1 TO 4: XDRAW 1 AT S
X(J),SY(J): NEXT J
6120 SU = 4: NX = 15: NY = 19: R = 32
: ROT = R: XDRAW 2 AT NX,NY: REM
DRAW
6130 DX = 0: DY = 0: RETURN
6990 REM
6995 REM SUBROUTINE SET SPEED
7000 ST = ST + 1: IF ST > 5 THEN S
T = 1
7010 RETURN
9980 REM
9990 REM DATA FOR FOUR MAZES
10000 DATA 4,93,57,186,57,186,13
3,93,133,0
10100 DATA 8,62,38,217,38,217,114
,93,114,93,76,62,76,62,152,21
7,152,0
10200 DATA 2,0,38,217,38,2,62,7
6,279,76,2,0,114,217,114,2,62
,152,279,152,0
10300 DATA 6,0,152,93,152,93,11
4,31,114,31,38,124,38,4,62,76
,155,76,155,38,279,38,5,124,1
52,124,114,186,114,186,76,279
,76,5,155,190,155,152,217,152
,217,114,248,114,0

```

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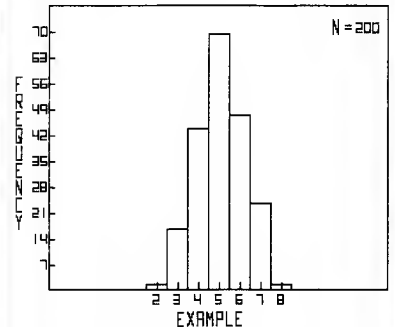
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yellow.) The I, J, K, and M keys move the mouse and the space bar stops it. The mouse cannot go through walls, and will munch any cheese touched. When all four pieces of cheese are gone, a new and harder maze appears. When the player completes all four mazes, maze 1 appears again.

This is an easy game for adults, but it is challenging for children because they must time their commands. The mouse cannot reach the cheese by following walls. Help the players learn to use the space bar to stop the mouse while they plan their next command.

Speed Changes

The game begins at the slowest speed, a speed that drives an adult bonkers, but that is very fast for children, especially at first. Five levels of speed are provided; control-S will increase the speed one level. After the fastest speed, the program returns to the slowest. Be sure your child is ready for the higher speed before you step up the pace. He or she will become frustrated very quickly if unable to control Munchy.

Press the escape key to stop the program. This is handy while you type in the program and get it running the way you want. You may want to delete line 1280 so the child cannot halt the program with any keypress other than reset.

The Program Does Not . . .

Notice what this game does not do. It does not keep score, so it does not teach competition. It is not violent. The little mouse does not zap invading aliens, but rather eats bits of cheese. No one feels much sympathy

for cheese. Munch Mouse is not threatening. No monsters chase Munchy, and no traps threaten.

Additional Mazes

To add mazes, change the 5 in line 6000 to the total number of mazes you want, plus one, and type in additional data after line 10300—one data line for each maze. New data begins with the number of x,y points in the list for a line, followed by the x,y coordinates. Thus, the first data statement in **Listing 1** (line 10000) draws a line between four points; the

first of the points is at $x = 93$, $y = 57$. A maze consists of a number of these lines. The last data for a maze is 0 to tell the computer that it is done. You can create any maze you want this way, but don't make the passages too small, nor the overall design too complex, or else your audience will get frustrated.

Munch Mouse is simply a fun game for little computer users. It teaches a few simple lessons, but it requires one important component—you, working with the child and enjoying the work. ■

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Listing 2. Shape table.

```
4000- 02 00 06 00 18 00 09 08
4008- 2C 08 36 36 36 1F BC 23
4010- 24 FC 12 16 1F FC 2A 00
4018- 49 49 35 C5 E1 1C 3F C4
4020- 09 3F 3F DF 17 4D 2D 2D
4028- 2D 3E 3F 3F 3F 1F 6E 2D
4030- 2D 2D 2D 35 3F 3F 3F 3F
4038- 3F 77 29 2D 2D 2D 2D 15
4040- 3F 3F 3F 3F 3F 0E 2D 2D
4048- 2D 1E 3F 3F 07 00
```

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The Basics of BASIC

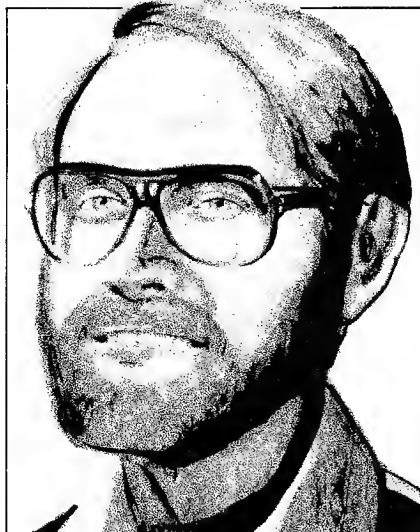
This month's column is the first installment in a series of articles covering the fundamentals of BASIC, starting at ground zero. For readers with programming experience who have followed my column over the previous months these articles will be a retreat to more elementary concepts. Others with less experience, who may have wondered what I was writing about, will find the material a welcome relief and, hopefully, a helpful and informative tutorial in BASIC programming.

I encourage you to send me a line about problems you encounter in writing BASIC programs. I don't have time to inspect lengthy listings to find why they don't work as they should, but short of that I will be happy to hear from you. Although I sometimes get behind in my correspondence, I try to answer most letters I get. Incidentally, a self-addressed, stamped envelope with your letter is greatly appreciated!

Five Functions, Two Modes

The computer may appear almost limitless in the number and variety of tasks it can perform. It can be a surprise to realize that there are actually only a very few functions such a machine can accomplish. These basic functions are illustrated in the **Figure** and described below. The vast capabilities of the computer are

possible because of the ingenuity of the human mind in connecting these few elementary functions so that they accomplish much more significant tasks. This human process is called *programming* and the results of the process are *programs*. A program, then, is a step-by-step sequence of instructions designed and



organized to make a computer perform a specific task.

Most computer programs involve the use of information, or *data*, that is needed before the specified task can be carried out. This data is fed into the computer using a function called *input*. The machine then digests the data in an operation referred to as *process*. You can see how the term "data processing" has become synonymous with "computing." Of course, if that were all that were involved, computers would be nothing more than information garbage disposal units. The last, but equally significant, function of computers is *output*, in which the digested, processed data is revealed to the user, most commonly in a video display or printout.

The processing function falls into three general categories. The first, *sequential* processing, I will discuss in further detail in this article. It involves simple arithmetic calculations and assignment statements. The second is *decision* processing and the third, which is actually a

unique combination of the first two, is *loop* processing. These will be dealt with in subsequent articles.

Finally, before getting into the elements of BASIC, you need to understand the two modes of computer operation that you will be dealing with. The first is *command*, or *immediate*, mode. As soon as you turn your computer on it is in command mode. This is true whether you are using a disk drive or not. The right bracket is the prompt that appears on the screen whenever you are in Apple-soft command mode. You must be in command mode to write a BASIC program. In this mode you can also use the computer as a sophisticated calculator, plus other useful functions.

Execute mode (called *deferred* mode by some authors), on the other hand, is the mode your computer is in when actually running a program. You, the operator, are not in control of the computer when it is in execute mode; the program is in control. The computer responds to the program's instructions and commands, not to yours. True, you may be required to type in data at the keyboard for the program to work with, but only when the program prompts you to. Come to think about it, in a sense you are under the program's control as well!

Line Numbers

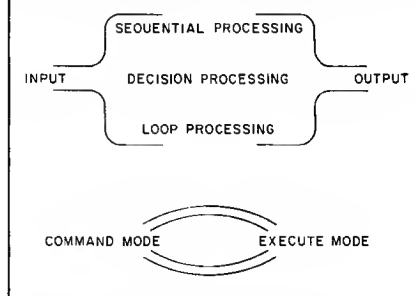
Each programming language has certain distinguishing characteristics. For BASIC the most obvious is that every program line begins with a *line number* (sometimes referred to as a *sequence number*).

This is not to say that every

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by Dan Bishop

Figure. Representation of five basic functions that a computer can perform and two modes of computer operation.



printed (or displayed) line begins with a number. Some program lines may be so long that they actually occupy three or four (or more) display lines. It is the first number in the first display line of a program line that is the line number.

It is also possible for several instructions or commands, totaling up to 239 characters in length, to be grouped together in the same program line and thus share a line number. BASIC uses the colon (:) to separate such instructions or commands from each other.

As for the numbers themselves, you can use any positive integer from 1 to 63999, and you do not have to number the lines consecutively. That is, if a given line has 30 for a number, the next line does not need to be 31. In fact, programmers usually increment line numbers by 10 for convenience in inserting additional instructions at a later time. For example, if a given line has 30 for a number, and the next line has 40, it is easy for a programmer to add a command or instruction between these two by giving it 35 for a line number. A total of nine new lines could be inserted between lines 30 and 40.

This brings to light another fact relating to line numbers. When a new line is written for a program, there is no restriction on the line number chosen for it. You might have a program with line numbers running from 10 to 150, incremented by 10, and decide that you need to add a line between 40 and 50. All you do is type in the desired line, giving it 45 for a number, and the computer will automatically sequence it in the appropriate place in the program.

This brings us to the purpose of the line numbers. The computer uses them to determine the exact order for executing the various instructions in the program. The order in which you type in the lines doesn't matter. The line numbers are what count.

Finally, to erase an unwanted line from a program all you do is type in its line number and press return; the computer does the rest. The easiest way to change a short line that already appears in your program is to retype it, using the same line number. When you press return the new line will automatically replace the old one.

Examples

A few examples are in order to illustrate the concepts I've described. The first demonstrate the differences between command mode and execute mode.

Type the command mode instruction NEW right after the command mode prompt (right bracket) and press return. This erases any leftovers from memory. Now enter $A = 12$. (By "enter" I always mean, "Type in the following and then press return." The return key effectively transmits what you have typed from the keyboard buffer to the computer for processing. All program lines must be ended by pressing return.) Then enter $B = 3$ and $C = A * B$. (The asterisk, *, means "times" in BASIC.)

Although no changes are apparent when you enter the three instructions above, the computer carries each out as soon as you press return. This is an example of sequential processing. In the first case the computer reserves a location in memory named A and assigns it the value 12. With the second entry the computer reserves a location in memory called B and assigns it the value 3. With the third entry the computer reserves a location called C and stores in it the product of the values in A and B.

These three instructions are called *assignment statements*, with the = sign taking on a meaning quite different from "equals." In an assignment statement the = sign is an instruction to the computer to take the value found on the right side of

the sign and store it in the memory location designated by the variable name on the left side of the sign. So the last equation should be read, "Assign the value resulting from multiplying A times B to the memory location denoted by C."

To prove that these assignments have actually occurred you need to enter one more instruction, telling the computer to display the contents of memory locations A, B, and C. BASIC uses the PRINT command to instruct the computer to display information on the video screen. PRINT is an example of an output function.

Enter the statement PRINT A, B, C. As soon as you press return the numbers 12 3 36 should appear on your screen.

In this example the computer is functioning as a glorified calculator. By using variable names (such as A, B, and C) for numbers and intermediate results, fairly complex calculations can be carried out in command mode. However, the equations you use in such calculations are lost as soon as they have been executed; they are not saved for future use. Only the results that are assigned to a variable name are retained in memory.

Now enter the following four program lines. (Don't forget to press return at the end of each!)

```

10 A = 12
20 B = 3
30 C = A * B
40 PRINT A, B, C
  
```

These are the same four statements you entered earlier. Now, however, each is preceded by a line number. You have just written a BASIC program.

You might have noticed that the values for A, B, and C were not printed this time. The reason is that when you enter a program line (as signaled by the starting line number), the computer takes the return as a command to add this new line to the others in memory, not to execute the instruction written in that line. None of these four instructions have been executed yet. To execute the program in its entirety you must type in the word RUN and press return. (No line number this time. This is a command mode instruction.)

What do you see? The same results as before, but this time from a

program. The instructions were carried out in execute mode without any further intervention from you. Enter RUN again and see what happens. All of the statements are still there in memory, so their instructions can be executed again and again.

Now enter the word HOME. This is Applesoft's command to erase everything on the video screen, while leaving everything in memory still intact. To prove it's still there, enter the word LIST. This command calls up a listing of the entire BASIC program currently in memory. But what about the values of A, B, and C? Are they still there?

To find out, enter the statement PRINT A, B, C. Sure enough, the values 12, 3, and 36 appear on the screen. Nothing has changed. Enter RUN to run the program again. It even executes just as before.

Enter the following lines, which the computer will automatically add to your program:

```
25 D = A - B
40 PRINT A, B
50 PRINT D, C
```

Then enter LIST to see the entire program. Note that line 25, which was entered out of numeric sequence, has been put in its proper place automatically. Note also that the new line 40 containing changes has replaced the old one. And line 50 has been added to the program.

Enter RUN and note how the results are now displayed. With two print statements the output appears on two lines. Each print statement automatically terminates with a line feed, sort of like a carriage return on a typewriter.

Your program has ended, simply because the computer ran out of lines to execute. You could have added a line 60 END with the same result. (Some versions of BASIC require an END statement.)

Before going further, enter PRINT B. You should see the number 3 appear on your screen. The ability to call out values from memory in command mode is extremely valuable when "debugging" a program that isn't working properly.

Suppose a program is humming along nicely, then suddenly "crashes"—that is, stops executing. You

will find the computer in command mode! The first thing to do if you don't know exactly what caused the crash is to display the values of all the variables related to that part of the program by using print statements. Frequently these values will provide clues as to which part of the program is malfunctioning.

Keyboard Input

The program you have in memory now is helpful if you want to know the difference between 12 and 3, as

well as their product; run it and you get 9 and 36. Sometime, however, you might want to know the difference and/or product from using two different numbers. Of course, the whole program could be rewritten, changing lines 10 and 20—but there is a better way.

BASIC has a command for handling data entry from the keyboard—the INPUT command. The word INPUT must be followed by the variable name chosen to label the memory location that will contain

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the value typed in at the keyboard.

For example, add the following two lines to the program we've been working with, then enter the word LIST to see the revised version:

```
10 INPUT A
20 INPUT B
```

The new program has no specific values mentioned for either A or B. Instead, it calls for each of these values to be typed in at the keyboard, allowing whoever is operating the program to enter two numbers of his or her own choice.

Whenever the computer runs across an INPUT command in a program it is executing, it stops and displays a question mark (?) prompt on the screen, then waits for someone to type in a response and press return. The return signals the computer to assign the value entered at the keyboard to the memory location labeled by the variable name in the INPUT command, and then to proceed with the next program instruction.

Enter RUN to execute this program. Sure enough, the first thing you see is a question mark, corresponding to line 10 in the program. Enter a value from the keyboard. (If you try to enter a letter, you'll receive the message REDO. The computer will not accept alphabetic characters when it expects numeric values.) As soon as you press return another question mark will appear, corresponding to the INPUT command in line 20. Enter a second value. The program then proceeds, calculating the difference between the two values and their product, and then displaying the two values, their difference, and their product.

The program is now considerably more versatile than before, since *any* two numbers can be used as input. You should always seek to maximize the versatility of a program by avoiding specified values wherever possible, especially when those values may change from one run to the next.

Displaying Alphabetic Information

In the previous program examples, numeric information was displayed using the PRINT command. This command can also display alphabetic information. The only no-

Program listing. Final form of the program developed in this article. Lines 10 and 20 are input statements. Lines 25 and 30 are sequential processing statements, and lines 40 and 50 are output statements.

```
10 INPUT "ENTER A NUMBER, PLEASE ... ";A
20 INPUT "NOW ENTER A SECOND NUMBER ... ";B
25 D = A - B
30 C = A * B
40 PRINT "THE DIFFERENCE BETWEEN "A" AND "B" IS "D"."
50 PRINT "THE PRODUCT OF "A" AND "B" IS "C"."
```

ticeable difference is that the text to be displayed must be placed inside quotation marks. To print a message on the screen you might have a program line that looks like this:

```
100 PRINT "WHAT A NICE DAY!"
```

You can also design complex PRINT commands in which numeric variables are mixed with text. *Each segment of text must be surrounded by its own pair of quotation marks, and each numeric variable must be outside the quotation marks.* Add the following two lines to your program and then run it. Compare the results with what you saw earlier.

```
40 PRINT "THE DIFFERENCE
BETWEEN "A" AND "B" IS "D"."
50 PRINT "THE PRODUCT OF "A"
AND "B" IS "C"."
```

Each of these print statements has seven segments. Four are text segments, enclosed in quotation marks. The numeric variables A, B, C, and D are *not* enclosed in quotes, in spite of appearances. Read each line from left to right, taking the quotation marks as pairs, and you will see for yourself.

Another helpful tool for displaying alphabetic messages on the screen is used in conjunction with the INPUT command. As long as you have only a single-segment phrase to be displayed, you can combine the phrase with the INPUT command. If your phrase has more than one segment, you must use the PRINT command to display the message and keep the INPUT command separate.

Consider the current program. When you ran it and saw the ques-

tion mark appear, you knew you were to enter a number. After all, it's your program. But what if someone else were to run the program? Wouldn't a prompting message be helpful so that person would know what to do? Add the following two lines to the program:

```
10 INPUT "ENTER A NUMBER,
PLEASE ... ";A
20 INPUT "NOW ENTER A SECOND
NUMBER ... ";B
```

When you run the program now, notice how much more sense it makes!

Please note the semicolon between the quoted phrase and the variable name in these two new lines. *Input statements that include a prompting message require the semicolon.* You will get a syntax error message if you leave it out.

Refer to the **Program listing** for a printout of the complete program.

Conclusion

This month I have built a foundation for future articles on learning to program in BASIC. You should now be able to use the PRINT and INPUT commands, and assignment statements with the four basic arithmetic operations: +, -, *, and /. With these tools you can create programs to calculate fuel consumption, an electric bill, floor space for carpeting, the size furnace needed for a room, and more. Or simply clear the screen (the HOME command works inside a program as well as in command mode) and display a loving message to someone who wishes you would spend less time on the computer and more time with them. ■

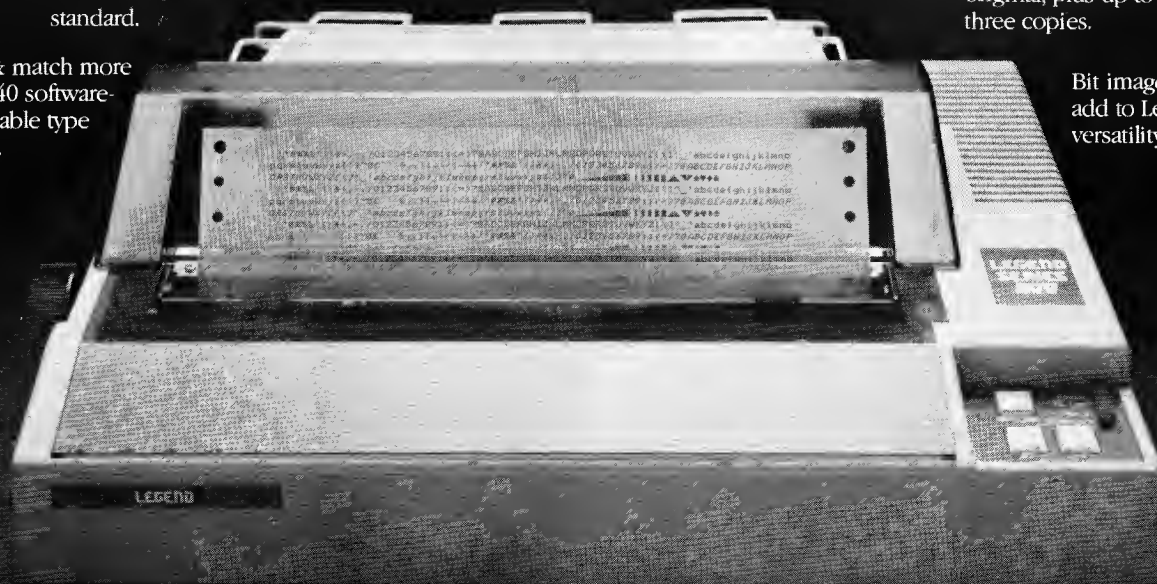
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Hotline to God

Cast aside any medieval notions that church organizers are stuck in the dark ages. With the support of the Church Users Network, churches are moving into the computer era.

CCUN, organized in 1983 by a group of United Methodists, helps churches be more effective in office management, as well as education and counseling. The organization keeps a list of available church software, and publishes a newsletter for those interested in church computing. During a May workshop, CCUN President Ken Bedell proposed the development of national data base searches for church software.

CCUN welcomes participation from all denominations, and includes approximately 300 member churches. Bedell noted that, if the national data base proposal develops, CCUN has the potential to expand to the quarter million churches across the United States.

If you're interested, write to CCUN at P.O. Box 1392, Dallas, TX 75221.



College by Computer

We've all seen those dubious advertisements on matchbook covers that guarantee a college degree at home in six weeks—or less. But now, home study takes on a new meaning. With the Electronic University, you can work toward a college degree with qualified instructors from accredited colleges and universities through your home computer.

Developed by Tele-Learning Systems, Inc., 505 Beach Street, San

Francisco, CA 94133, the Electronic University product retails for \$90 and is compatible with the Apple II family, Commodore 64, and IBM PC. To "attend" EU, the system connects the student's personal computer to the instructor's computer over the telephone. Classes are between \$35 and \$100, including telephone costs.

According to founder Ron Gordon, the Electronic University has more than 200 colleges and universities evaluating and developing courses for the system. Gordon touts the educa-

tion system as "the first meaningful, continuing reason for having a computer at home."

Cream of the Crop

Who said high-tech firms are cold and impersonal? They actually make up one fifth of *The 100 Best Companies to Work for in America*. You might want to spruce up your old resume after reading this book by Robert Levering, Milton Moskowitz, and Michael Katz.

A recent *Computer-world* review of the book cited Apple Computer, Inc., IBM, Computer Data Corporation, and Bell Labs as among the best. Imagine joining IBM's recreational club for \$5 a year or planting a plot in CDC's employee vegetable garden. Apple ranks in the ten best for employee benefits.

Although each company has its own personality, the authors write that for each an employee camaraderie exists behind the corporate structure walls thanks to employee benefits, good pay, security, and advancement offered by the firms.

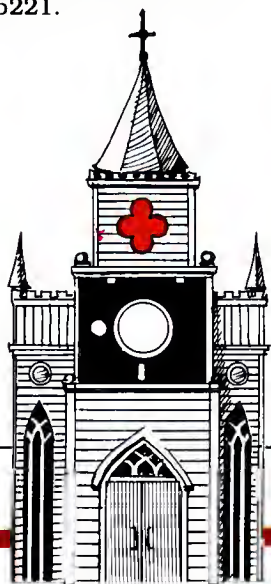
It's a Family Affair

Name the fastest growing group of computer buyers. No, it isn't professional people, nor is it college students. Families with children under 18 pull the most clout in the marketplace, according to

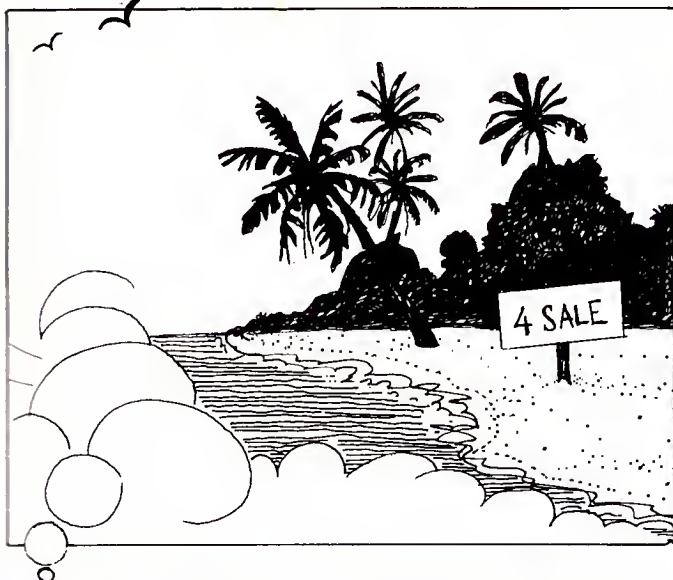
findings of a TALMIS study, "U.S. Consumer Demand for Home Computers: How Many Will Buy?" TALMIS is a research firm for the computer industry.

Families buy computers for the supplemental educational and entertainment value they give their children outside of

school. Surprisingly, more men (56 percent) than women (42 percent) indicated they were extremely interested in using the computer to develop children's skills. The only computer function women appreciated more than men was its babysitting ability to keep the kids entertained.



edited by Cynthia Carr



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For more information, contact Collector's Data Service, Ltd., 420 West Mercer, Seattle, WA 98119.

Museum Networking Links Past with Today

There's more hidden behind the archives of the New York State Historical Agency Network than you would expect.

Apple Computer, Inc., has awarded four //e's to establish a telecommunications network—consisting of the Regional Conference of Historical Agencies, the Division of Historical and Anthropological Services of the New York State Museum, the Federation of Historical Services, and the Lower Hudson Conference—using the computers and telephone lines. It is the first grant Apple has given to historical agencies and museums to start such a network. The idea is to use today's technology to preserve our past.

Through the network, agencies within the state will have immediate access to updated technical information. Michael O'Lear, Regional Confer-

ence director and network coordinator, said the data base should be in operation by November 1984. O'Lear said the network will share a consultant directory and inventory system with members. Other museum professionals and historians can also take advantage of the network for research purposes, such as those involving census records or grant searches.

Collectively, the network represents more than 400 historical agencies and museums, and the Division of Historical and Anthropological Services oversees 1600 county and municipal historians in New York State.



News flash: If you've got the who, what, where, when, why, and how about something in the computer industry that inCider readers will find interesting, send your news items to Cider Press, inCider, 80 Pine Street, Peterborough, NH 03458.

Consumer Alert!

inCider has received five complaints against one of our advertisers—Carolina Microsystems, 1114 Washington Street, Columbia, SC 29281, John Woods, president. We have sent three letters to them, one certified, and have received no response. We phoned and left a message to have Mr. Woods return the call. Again no response.

The number of complaints and Carolina Microsystems' disinclination to respond to our communications prompts us to warn readers of possible problems in dealing with this firm.

Also, Russell Smith, formerly of 21st Century Computer Systems, Ltd., of Box K81 #804, 323 Franklin Bldg. S., Chicago, IL and 240 22nd Street East, Saskatoon, Saskatchewan, Canada, has informed us that 21st Century Computer Systems, Ltd., has gone out of busi-

ness. Anyone requiring further information should contact Russell Smith at Computer Visions, 894 Portage, Winnipeg, Manitoba, Canada R3G 0P4.

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—the editors



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inCider's inSidious inSolubles

BASIC programming is fun, fruitful—and frustrating! But even your frustrating encounters can be fruitful and fun. If your programs run widely off to spaces hither and yon or produce results that would strain the credulity of the most gullible, you can simply slip those inSufferable and inSalubrious inCitements into an envelope and send them on to us. If your entry is printed you will receive a free 12-month subscription to *inCider*, or your present subscription will be extended, and your name will be proudly displayed with your inSoluble.

If you haven't submitted an entry, why not? The rules are simple enough and you'll find it's more fun than frustrating. Send your entries to me c/o *inCider*, 80 Pine Street, Peterborough, NH 03458. If you would like a response to your submission before it appears on *inCider's* pages, please enclose a self-addressed stamped envelope.

Rules for inSidious inSolubles

1. An inSoluble must be a BASIC program in Applesoft. Any POKEd machine language subroutines and CALLs to that subroutine must be correct.
2. The program must accomplish something. In other words, when it's run you should get some kind of a result.
3. You should not get an error message of any kind. If you do, check your typing.
4. Include a short explanation of what the program is supposed to do. This explanation may contain clues to the problem.
5. The program may use common peripherals such as disk, printer, or modem.
6. The program may have more than one error.

The shorter the inSoluble, the better. We like programs that do some-

thing useful. Remember to provide the solution!

The Banker's Dilemma

Kenneth Flood of Appleton, WI and Mike West of Cincinnati, OH entered similar problems for our first reader-submitted inSoluble, *The Banker's Dilemma* (**Listing 1**). Pity the poor banker who simply wanted to determine the comparative sizes of his customers' deposits. The deposits are found in the DATA line 100. Running the program will reveal the banker's dilemma. If you're having trouble, substitute different sizes of deposits. The solution is as simple as A, B, C.

The Wayward Timer

Our second problem comes from Joseph Cygman of Montreal, Canada. Here a three-digit timer is programmed to run on a corner of the screen. *The Wayward Timer* (**List-**

Listing 1. The Banker's Dilemma.

```
10 HOME : REM BANKER'S DILEMMA
20 FOR X = 1 TO 10: READ G$(X): NEXT X
30 FOR X = 1 TO 10
40 IF X = 10 THEN END
50 PRINT "G$(X);"; " "
60 IF G$(X) > G$(X + 1) THEN PRINT
   "IS MORE MONEY THAN";: GOTO 90
70 IF G$(X) < G$(X + 1) THEN PRINT
   "IS LESS MONEY THAN";: GOTO 90
80 PRINT "IS EQUAL TO";
90 PRINT "G$(X + 1)";: NEXT X
100 DATA 1341.16,928.58,1182.75,
   1649.37,1649.37,827.42,1014.
   24,1014.24,947.11,9999.99
```

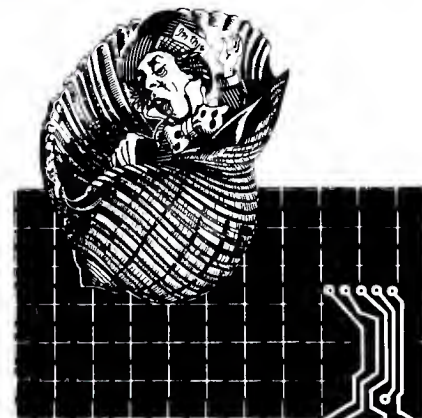
Solutions on page 87.

Listing 2. The Wayward Timer.

```
10 REM THE WAYWARD TIMER
20 TEXT : HOME
30 VTAB 10: HTAB 12: PRINT "THE
   WAYWARD TIMER"
40 SPEED= 125: INVERSE
50 FOR I = 120 TO 0 STEP - 1
60 VTAB 1: HTAB 38: PRINT I
70 NEXT I
80 VTAB 24: END
```

ing 2) will start at 120 and count down, by seconds, to zero. There are, however, errors of notable count.

Ken, Mike, and Joe will each receive a free subscription to *inCider* for their efforts. ■



by Art Ude

An Interview with Steve Wozniak

by Jeff DeTray



"I just wanted to build the computer that I knew I wanted. . . that was my goal."

The Triangle Building dominates the Silicon Valley landscape at a point where Santa Clara, Sunnyvale, and Cupertino come together. Inside this unique three-sided structure work the men and women of Apple Computer's Personal Computer Systems Division (PCSD), developing and improving the firm's line of 8-bit computers. PCSD is an exciting place; things are happening there. The most celebrated denizen of The Triangle Building is Steve Wozniak.

Wozniak. The Woz! Computer designer extraordinaire. Guru of the Apple II. Promoter of the US Festival. Corporate dropout. A genuine original.

With Apple once again expanding the Apple II line (with the //c), this seemed a highly appropriate time to talk with Steve Wozniak, to ask him to reflect on the past and to anticipate the future for himself and for Apple. Wozniak is a man in motion, a moving target, always on the go. But once our interview began, he settled down to speak freely, openly, and at some length about himself, Apple, and the computer industry. We caught up with Steve Wozniak in a fourth floor conference room near his office in the Triangle Building.

inCider: Let's begin with a little history of you and Apple. When and where did you learn to design computers?

Wozniak: I grew up in Silicon Valley, so all the kids had engineers for parents; we were electronic-hobbyist-oriented to begin with. Computers weren't in any of the schools yet, and nobody really knew what computers were—registers and buses and ALUs

and instructions and memory. Nobody really learned that by high school then—that was '64-'68. My father was an engineer at Lockheed, and he gave me a manual. It was a 1958 IEEE discussion of what computers were in those days, when the memories had storage display tubes that stored 256 by 256 bits on them.

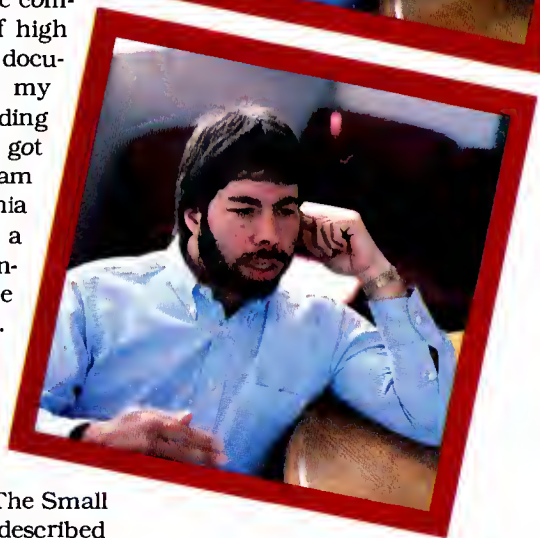
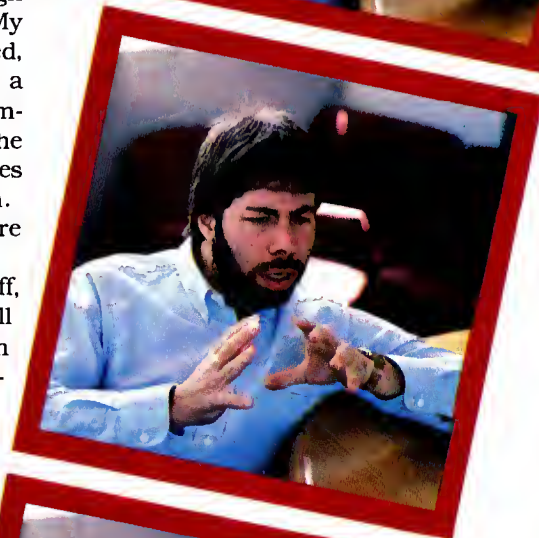
inCider: Is this even before iron core memory?

Wozniak: Yes. It was ancient stuff, but I found it intriguing to read all this stuff that nobody ever learned in school. So I got interested in computers, and I also got an understanding of the basic elements of computers. I got the concept of what the computer was. Near the end of high school I ran into a couple of documents that finally keyed my head into totally understanding what a computer was, and I got put into a special program where I could go off to Sylvania and learn how to program a computer. There I encountered a manual on one of the first small minicomputers.

inCider: This is still in high school.

Wozniak: Yes. So I encountered a manual that almost nobody would expect to encounter. It was called "The Small Computer Handbook." It described every single aspect of the PDP-8 computer from DEC, which was the first popular minicomputer. All my learning was self-taught out of those manuals.

Now I knew what computers were. Every time I could get a minicomputer manual, I would design a computer. So I designed about 50 computers



“Being a businessman had the bad connotation of being a politician.”

around 1970—the first couple of years out of high school—and I just kept designing, designing, designing. I could never get the parts to build my own, but I knew that someday I would save up the money and buy a computer.

inCider: I understand that the Apple I was designed as a project to prove that it could be done, to show your friends at a computer club.

Wozniak: Yes, it was done to take to a computer club to share and socialize the interest I had, which was computers along the line of minicomputers. Then came microcomputers, and the CPU was all on one chip. I was in exactly the right evolutionary stage to do the Apple I and II.

inCider: I've heard you were a reluctant entrepreneur. How did you make that transition from do-it-yourself into starting a computer company?

Wozniak: I was a very reluctant entrepreneur. I was a total technical person my whole life, a mathematical person, and I believed that the only good was doing a good, clean, pure, useful, neat device that did something for people, in other words, designing a computer. That was the only thing that had value. Being a businessman had the bad connotation of being a politician—can't throw stones, a lot of deceit, those sorts of feelings. After I designed the computer [the Apple I] and was showing it off at the club, Steve [Jobs] came along and said, “A lot of people want to build these things. Why don't we just make and sell a PC board for them?” We did some calculations and figured out we'd probably not make our money back. It would cost about \$1000 to lay out a PC board and get some made. It was questionable that we could sell that many at the club. I figured we'd lose all our money, and he said, “Yeah, we'll lose all our money, but we'll have a company for once in our lives.” And I thought that was neat. It was a little fantasy, and it was attrac-

tive. That's why we started. In other words, because it wasn't justified by thinking whether we'd make money or lose money, it was worth doing.

inCider: At what point did you realize that Apple Computer was going to take off and become something big?

Wozniak: First of all, we were going to sell blank PC boards for \$40. Then we got a big order for \$50,000 for completely built PC boards for the Apple I. We sold Apple I's out of the garage for the first year, and we were more successful than we ever thought we'd be. Even though we sold only 175 boards and really didn't make any money at it, we had a company. The name Apple Computer had become known. We'd done a little bit of travel, and we'd gained respect where it was important to us, so we'd already won.

Going into the Apple II, we had a product that was very good, and it looked as if we could sell thousands of them. We had to take a major step, because we needed a lot of money to build 1000 computers, and we needed a lot of organization. We needed the marketing, the operations, the corporate drive, the press, the engineering—everything had to work. We had to find an office, and go on the hook for a large number of dollars. We had to take a bit of a risk for the first time. We had to order chairs, things like that. The question was: Do we start a real business?

At this point Mike Markkula came on board. He was going to loan us the \$250,000 we'd need to make the first 1000 Apple II's because he thought it

“We had gained respect where it was important to us, so we'd already won.”

was such a good product, and he wanted to join us. He gave me a deadline date. He said, “You have to quit Hewlett-Packard and make Apples full-time.” It was a difficult decision. My motivation all along had been just to build a computer for fun, to show off to my friends down at the club. The ultimatum date came up, and I decided that since I'd been designing all this stuff part-time anyway, I shouldn't have to leave HP. I said no.

inCider: But eventually you *did* decide to leave.

Wozniak: What



happened was that Steve Jobs was crying and he called all my friends and relatives and got them on me. Finally they talked me into it. I realized, “Heck, I can still design whatever nifty things I was meant to do in my life as a hobby anyway”. The company is a conscious attempt to turn it into money. That to me is the reason you start a company. It didn't infringe on my being able to design products in the future.

inCider: At one point you took a two-year hiatus away from the company. Why?

Wozniak: In the early days, I was absolutely critical to the company, but throughout '79 and '80, we finally staffed up a large organization, including an engineering organization—50

"I was in exactly the right evolutionary stage to do the Apple I and II."

"We did some calculations and figured out we'd probably not make our money back."

engineers all working on projects, all very bright. I, an engineer and not a manager, could easily leave and nothing in the company would get hurt. I had a strange position: I couldn't really stand up for doing whatever I wanted on a project, because that project would happen because of who I was and not because of the technical merits. I couldn't get used to sitting for months, just going to meetings and writing huge documents about things that were fairly obvious. I wasn't totally happy, and I did want to take time off, but I couldn't go to the president and say, "I've got to get out of here." I could never say that I wanted to leave Apple for a minute.

I'm sure the plane crash scared me, but when you've got five weeks amnesia, you have no anxiety getting into another plane.

inCider: Then before you returned to Apple two years later, you did the US Festival. What was your motivation there?

Wozniak: I would think that 100,000,000 people in this country every once in a while think, "Wouldn't it be neat if . . ." I got one of these ideas that normally I would forget ten seconds later. All my life, ideas would come up and my big thing in life was to always try to make it real. Everybody thinks it's fun as a joke, but it's fun in reality too. This idea occurred at a strange time, where I didn't forget it ten seconds later. I had already left Apple, so I wasn't tied to a full-time engineering job. I

inCider: Did you accomplish what you set out to do?

Wozniak: Yes, I created a great product, very far short of catching on so big that it would be hugely profitable. It was a huge [financial] loss, and if there's a future one, it will not be.

inCider: Who are some of the people in the microcomputing industry who you really respect?

Wozniak: I admire Steve Jobs for his intelligence and for his ability to build a framework of what makes sense technologically. It's so clean and pure and well understood, it just makes too much sense. He doesn't go off in a lot of different directions. He just does something because it makes sense and it's good. I appreciate his drive in that way. Often he leaves a framework that turns out to be wrong, like the computer salesmen for the Apple III or the Lisa, but a new framework will pop up to take its place. It's exciting and intriguing. I

don't think there's another individual like him in the country right now in technology, as far as leading technology.

John Sculley — I never understood what a very capable president of a large company could be. What we had before Sculley was not what he is now.

It's lucky for me because of my position just to see such a thing, sort of as an outside observer, to see different types of people do their work. Other technology leaders—Grace Murray-Hopper. She was on "60 Minutes" or "20/20," and it was intriguing to listen to what she was saying.

inCider: How do you allocate your time at Apple these days?

Wozniak: You could ask that question 20 times during the year and get 20 different answers. You're catching me at the end of one where I'm extremely tired from my most heavily scheduled month ever. I'm on-site only

Then I had a plane crash, and that gave me the opportunity.

inCider: Can you talk about your airplane accident?

Wozniak: I have no idea what happened. I have five weeks of lost memory.

inCider: Were you the pilot or a passenger?

Wozniak: I was the pilot. The plane took off and had some problems, then I crashed.

inCider: Are you still flying?

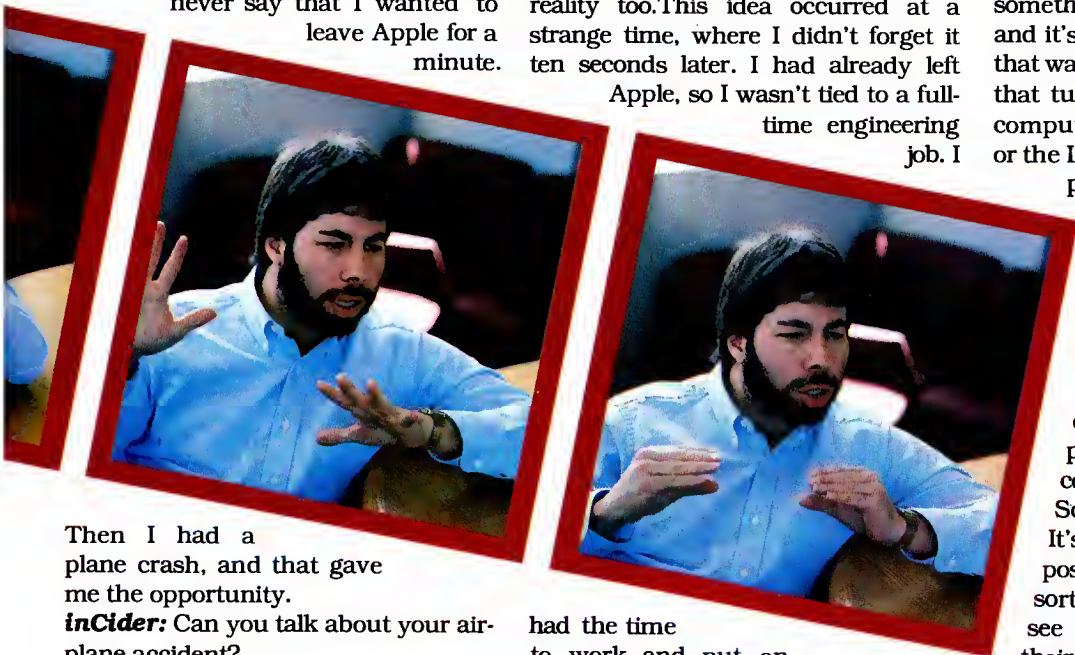
Wozniak: Yes, just for the fun of it.

inCider: What scares you?

Wozniak: Nothing. (pauses) Bugs.

had the time to work and put on this kind of event for real. I also had the resources and was not tied to them in the normal way, where accountants are investing them in the most predictable rate of return.

The idea occurred, but three things made it possible and made it very likely: I was not working (if I'd been working, anything like that would have been dead), I had the resources, and I was willing to take a big risk with them where something seemed exciting.





"I was willing to take a big risk where I thought something seemed exciting."

50% of the time, although I want to be fulltime. I travel a lot. I still travel to user groups, maybe 50 times in the last three years. When I'm here, I go through phone calls and mail for four hours, and I can barely hold even with that. I can participate in a project group, but I cannot be a full-time designer. My goal is to be a designer again.

inCider: So you want to get back to more technical work?

Wozniak: Absolutely.

inCider: Do you have any avenues of investigation in mind?

Wozniak: New versions of personal computers. Two of them are low-end personal computers. I'm thinking of a software project that would be more like a different style of operating system, à la Macintosh, but implemented in such a way that the higher-level languages have a more unified function, rather than just the final applications. I'd also like to pursue some work I've done in the past on very efficient algorithms for floating-point arithmetic.

inCider: Do you think we will see a

low-end low-cost Apple-II-compatible computer sometime in the future?

Wozniak: I work in the Apple II division, and we're always working on lower cost, or I'd rather phrase it as more function or more-performance-per-cost versions of the Apple II. That will never end, and as long as we have any successful product anywhere, we'll always be working on it.

inCider: Where else can the Apple II line expand?

Wozniak: There are all these technical directions to take if it makes sense to go forwards into more capabilities. Inside Apple there's always a lot of consideration. Should we do an 8086/16-bit/MS-DOS type of machine? I doubt we would go in that direction. The other way to get to 16 bits is to see if the 6502 and the Apple II line can somehow move up into the 16-bit world.

I can think of two ways the Apple II can go there right now. We could put MS-DOS into an Apple II. That has already been announced, and a good external device [Rana 8086/2] was designed which is basically a plug-in into the Apple II. The other way is the 65816 microprocessor. It's totally 6502/8-bit compatible, but it has additional modes and additional instructions that do 16-bit work and supply a 24-bit address, which is more important. Everybody thinks the width of your register is worth something. Sixteen is twice as good as 8. Thirty-two is twice as good as 16. It turns out that, if you go from 8 to 16, you only increase your performance about 10, maybe 15 percent for almost anything. It's insignificant. But if you increase your address from 16 bits to 24 bits, you now can do software such as Lotus 1-2-3.

We've got a software lag in the Apple II line. We've focused the Apple II on the home, consumer, and education markets for so long, we didn't really let it compete up in the business market. We had a much finer product up there, the Apple III. Unfortunately, IBM moved in and now has the lion's share of that market. A lot of the sophisticated software they've got on the IBM PC causes potential buyers to say, "You can't do this on the Apple II," because we can't support enough memory on the Apple II yet. This new processor, the 65816, has 24-bit address space. Everybody's going to say, "Is it 8 bits or 16 bits?" They're going to miss the real key—being able to address 16 megabytes instead of 64K.

We're pursuing that direction very heavily, but with any direction we pursue, it's difficult to define all the alternative products that could come out. It's really too difficult to say, but we're almost there.

inCider: I heard a quote attributed to you which indicated that the Apple has graphics capabilities that have hardly been tapped yet.

Wozniak: I think I know where the comment came from because it keeps recurring. We've gone through many stages of enhancing the Apple II product line from Day 1, and we're always caught between—we've got to ensure maximum compatibility, we can't forget our faithful customers from the past, but we've got to provide new enhanced features.

Through the years we went from the Apple II to the Apple II Plus—integer and floating-point arithmetic. We went from cassettes only to floppy disks with cross-over periods. We've gone from the Apple II Plus to the Apple IIe, where we added lowercase. A lot of Apple II Pluses can do [lowercase], so that was very compatible. We added a couple of features in the Apple IIe that were impossible on an Apple II Plus. We added memory extension to 128K, and it was done in such a very awkward way that it's difficult to plug in a card to the Apple II Plus ever, and do it the same way. We also added double hi-res graphics (this is what your question gets at), which doubles the graphics resolution. You got 16 colors instead of 4 colors in the hi-res video mode, and that's the biggest step the computer could have taken.

When you come out with a new feature that is not in the prior product, the new product has to sit around and survive the marketplace for a couple of years before people are going to realize it's a big enough market to address with software that won't run on the older II Plus machine. Software using that mode has not occurred yet. Nobody's used it, because the large installed base of Apple II's and II Pluses don't have a way to run that video mode yet.

I suspect that the first software that will use it will be true to the Apple step philosophy of a piece of software that has the extra complexity to handle both video modes. That software's difficult to write, and it takes a period of time before it shows up. If you introduce a new feature in 1983, good software won't appear until 1984 because it takes time to write software. I



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would say by the end of this year some use of that video mode will start appearing.

inCider: You said that in the foreseeable future the Apple II line will be extended, enhanced, expanded. How long can that sort of expansion go on? Is there a limit?

Wozniak: Oh, sure.

inCider: What do you think it is, in terms of years?

Wozniak: If you had the inside story around here, it's always, "In six months, the product line will die." That's what we said in 1977, and every year since, including this year, so I would have to say it's always been the case. It's amazing, because we're focusing a lot of attention on the Apple II line now as far as improving the product. We've been shallow in the improvements over the last three years because we all knew how good a computer the Apple III was, even though it had its problems selling. We knew how great it was, and we fought for a very long time to make that product successful, despite its poor start. That was why upwards thinking did not go into the Apple II. We had our great product [the III] in the business market. Now we're going back and aggressively moving the Apple II in that direction. In addition, we've got the Macintosh and Lisa in the higher end.

inCider: Which microcomputer manufacturers do you think will be around in five years? Let's assume Apple will be. Who else?

Wozniak: I'm not close enough to the considerations that a business student and a marketing person would say. Oddly enough, Apple's been around for seven years in this market. So has Commodore. IBM, obviously. There are very few others that are not in doubt.

inCider: Did you think Apple Computer would make money when you went big time?

Wozniak: Yes. I respected Mike Markkula's experience in that part of the world. Steve and I really didn't have any. We had established a name with our little Apple computer. We weren't taking a big risk. I was leaving a job; I could always get a job. I sold a calculator, but I worked at Hewlett-Packard and I could buy the next version cheaper. There never was a big risk. I thought we would make a lot of money. Mike Markkula predicted it although I didn't believe any of his numbers. We went to our first trade show, a little end-user show called the

West Coast Computer Faire, and introduced the Apple II computer. There were all these little kids running around with holes in their jeans looking at computers. There wasn't a single peripheral or floppy. At the end of the show, Mike Markkula looked at me and said, "Just by looking at the enthusiasm in the crowd, everything you've been dreaming of, you know we're going to make it. Five hundred million dollars, we're going to make it." I don't know how he took the inputs that he saw at that first show plus the analysts' report of how the market was expected to zoom, and somehow visualized that we were going to make it.

inCider: Did the company evolve the way you thought it would?

Wozniak: When you've never been anywhere near business, you have no idea. You have no evolving thinking. Every step of the way seemed right and natural.

inCider: What factors do you think have enabled Apple to stay on top for so long, when so many others have come and gone?

Wozniak: A lot of it had to do with our start. An unusual thing happened with the Apple II product line. When we came out, we were the first, but that also meant we could misgauge what the market was. At first, we thought the market was the home, people keeping their checkbooks, their garage door, and their oven connected to a computer, and in the end, it turned out that what the market wanted was really just a less expensive computer. You could own your own computer; you could use it for some serious business applications. It is difficult to describe, but being first, we could follow the direction the market was going. We put out a very general machine. That's very easy to do. When you walk into the market today, you've got to have a very specific market in mind and do a very focused job.

The first competitors were the TRS-80 and the PET. In people's heads, Apple was established as the better product. We had color. We had graphics. We had hi-res. We were the first computer to have BASIC in ROM. We had the better styling with the plastic case. We had the switching power supply. We had more memory you could put on the board. We had a better I/O scheme so you could plug in cards. So Apple was better. The only reason for not buying an Apple was that it cost a lot.

Now, a funny thing happened. We were all about equal. It was hard to say who was really the leader. It was questionable who would come out of this whole thing. Then software started getting more and more sophisticated. Eventually the software got up to the level where it needed a 16K or a 32K computer.

Then VisiCalc came out. It could not run on an 8K TRS-80 or a 4K PET. VisiCalc needed an Apple which was designed with 48K in mind from the start. It didn't cost us anything to allow this huge upwards option, and that was really the trade-off. All of a sudden, our machine had the capabilities, and other machines didn't. So we became the leader, and we held that for years.

It's strange, because in the small computer world, the IBM took it away only in the markets that needed a more capable machine—more memory, hard disks, operating systems that could handle those features. Now we've got to get back in there and do our work to fight it out.

inCider: I've seen software that brings some Mac-like features onto the Apple II. Is that a trend we can look forward to?

Wozniak: It's a trend; it'll be long-term. We've introduced the mouse on the Apple IIe. We're going to make the mouse a standard secondary device even in our Apple II lines that weren't designed for a mouse from Day 1. The software will go there gradually. It'll be a long time before a product that grew up with other styles of operating systems and user interfaces can totally convert over and have a new operating system with the Macintosh user interface. It can be done. It's a software task that can take two or three years. That's what it took for Macintosh. So I don't think the frameworks will change very rapidly.

inCider: Part of the philosophy of the Mac seems to be that it is a machine that doesn't require you to remember command syntax and such. Do you think that everybody in the microcomputer industry is going to go in that direction?

Wozniak: In the end, that will be the only thing that will be acceptable for a user environment. It's a more difficult operating system to write and to define. It's got more complications, and it's more difficult to write software that works in that environment. Software for the Macintosh is going to come out more slowly than it can

come out for an IBM PC or an Apple II. But when you're going to make a product for a million people, you should put all the effort and complication into designing it. That should be the complicated part. It should be easy for the end user, for the millions.

inCider: It sounds like there's going to be a good market at Apple for some clever software designers.

Wozniak: Yes. It's a little difficult because once you see that approach to an easy piece of software, it's going to take a year instead of three months to write your program. It's the only way you'll do it, because it's right. In the end that's where all the good products will pop out.

inCider: And you'll continue to maintain compatibility between models?

Wozniak: We were extremely strong in that kind of thing from the Apple II to the Apple II Plus, when we went to floating-point BASIC. We were not very strong in that when we went to the //e. We have some features that have a lot of problems being used and don't have a substitute on the Apple II Plus.

Going to the Apple //c, though, it was probably the best job we've ever done of remembering the existing computers and being very compatible. You can't forget them just to go off and do a better machine. Commodore always runs off and does a better machine. They just do the best machine you can possibly do this year, and the older machines are forgotten. When a user is buying a computer, he thinks of a company like IBM, or now Apple, as "If I buy this product, am I going to be pretty safe and be able to buy what I need and upgrade and find better software when it comes out and run it on my machine for the next ten years?" And the answer is yes for IBM and yes for Apple, and that's where we two stand out. It's important to show the world. The Apple II line is the case where we've done an incredible job of adding features, but only in steps that were very compatible and didn't leave our prior users behind.

inCider: One thing that sometimes happens is that, when you get successful, you lose touch with people. Do you still have friends in computer clubs?

Wozniak: I travel to the computer clubs. I've done 50 talks to them, and I do it all at my own expense. Apple doesn't even know I do them. It's not written up in Apple's press. I spend hours just talking to them, meeting

them, and knowing who they are. I don't participate currently; I don't have the time.

inCider: Have you outdistanced some of those people socially? Is that part of your problem?

Wozniak: No, it's no problem. My personality didn't change, and everyone I run into who knew me over those years says, "You didn't change at all!" I go to the clubs, and instantly I get a rapport in talking to them. Part of this comes from me still being a computer user, especially on the Apple II. We sit down and talk and say, "Oh yeah, I've got that program, but I couldn't quite do this, and I couldn't modify that, and they should have de-

signed it so that it would handle that printer card too, because I had to buy a new one." Talking like that, we get a much higher level of communication than clubs would get from executives.

inCider: I was struck with what you said about building computers in your garage.

Wozniak: I just wanted to build the computer that I knew I wanted after a ton of experience in my early life. It was really for me, so I *was* the market. But part of it was motivated by being able to go to the social atmosphere of a club, show it to somebody, and get good feedback. "You did so much with so few chips?" That was my goal. ■

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The Apple IIc



by Bob Ryan, inCider staff

Photo courtesy of Apple Computer Inc.

The newest member of the family goes head to head with the PCjr.

There was quite a stir in the industry last November when IBM finally announced the PCjr, a computer designed to be used in the home. After months of conjecture, the machine itself turned out to be a disappointment (no product could have lived up to the jr's pre-release publicity). The jr did signal, however, that IBM is prepared to compete in all segments of the computer market, including the volatile home market. On April 24th, at the "Apple // Forever" festival held in San Francisco's Moscone Center, Apple Computer unleashed their latest salvo in the personal computer wars, the Apple IIc, aimed squarely at the PCjr.

The IIc is a transportable version of the Apple IIe, and a direct descendant of the venerable Apple II. It is the first computer that Apple has targeted specifically as "a computer for the home." What follows on these pages is a de-

scription of the IIc and of the family of products that Apple is making to support the new machine. Next month, I will present a head-to-head comparison of the IIc and the PCjr.

Out of the Box

The Apple IIc carries a price tag of \$1295. The computer is packaged in a bright red box that contains the system unit, the external transformer, an RF modulator that connects your computer to a TV, the owner's manual, the set-up manual, and five disks that provide about nine hours of entertainment and instruction on what your new computer can do.

The system unit is a cream-colored plastic case that contains the motherboard, keyboard, disk drive, and the ports that the IIc uses to communicate with peripherals such as printers and video displays. The entire unit weighs only 7½ pounds and has a footprint that measures 11½-by-12 inches. It is as small as many of the popular lap-top

computers, such as the Radio Shack Model 100. The advantage of the IIc is that it has a disk drive built in.

Motherboard Mania

The motherboard contains the electronic guts of the IIc. It carries 41 chips, ten more than the number of chips on the motherboard of the Apple IIe. The increased chip count is deceiving, however, since the IIc has the equivalent of five expansion cards built into the motherboard.

The most important chip on the IIc motherboard is, of course, the microprocessor. The IIc is built around the 65C02 MPU (microprocessor unit). The 65C02 is a CMOS (complementary metal-oxide semiconductor) version of the 6502 found in earlier Apple II computers. The main advantage of CMOS chips is that they use a lot less power than conventional chips and consequently produce a lot less heat. This is important, especially in a machine like the IIc that crowds so many compo-

Write to Bob Ryan, c/o inCider, 80 Pine Street, Peterborough, NH 03458.



Photo 1. The back panel showing the ports through which the //c communicates with the world.



Photo 2. The optional external disk drive. It has a formatted capacity of 143K.



Photo 3. The Apple //c monitor and stand.

nents into a very small space.

The 65C02 is more than just a CMOS copy of the 6502. It is an improved version. Its architecture includes eight completely new instructions and true indirect addressing. These improvements result in nearly 30 new opcodes and make the 65C02 easier to program than the 6502.

The Apple //c comes with 128K bytes of RAM (random access memory), allowing the //c to utilize the double hires graphics that first appeared on 128K Apple //e's. Since the 65C02 has only a 64K address range, the second 64K of memory is accessed using bank-switching. The other memory found on the motherboard is 16K bytes of ROM (read only memory). As with the II Plus and the //e, this ROM contains the Applesoft BASIC interpreter and the system monitor routines. The //c ROM, however, also contains routines to use the Apple mouse, which is available as an option. These routines, and the fact that the //c ROMs use some 65C02 instructions that are not available in earlier Apple II's, has created incompatibility with a small amount of existing //e software. Apple is working with the makers of this software to eliminate the incompatible code.

Other major components of the //c motherboard are the memory management and input/output chips, which were first developed for the //e, the audio and video generation circuits, and the specialized chips that control communication with the outside world. These include two chips that function as two Super Serial expansion cards, an IWM (Integrated Woz Machine) chip that acts as a disk controller card, and a mouse interface. The //c has so many functions built in that require expansion cards in the //e that it has no need for expansion slots. The //c

is a machine that is not meant to be opened by its owner.

More Inside

Also found inside the //c are the speaker, which at 1 3/8 inches is slightly smaller than the speaker in earlier Apples, the power supply, and the inter-

nal disk drive. The audio output of the //c has been changed in two ways. First, for long-suffering game players (and the people they live with), the //c has a volume control. And if that isn't enough, the //c also comes with an ear-phone jack so that game enthusiasts can enjoy the full benefits of the //c's



Photo courtesy of Apple Computer Inc.

Apple //c Personal Computer

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010

Price: \$1295

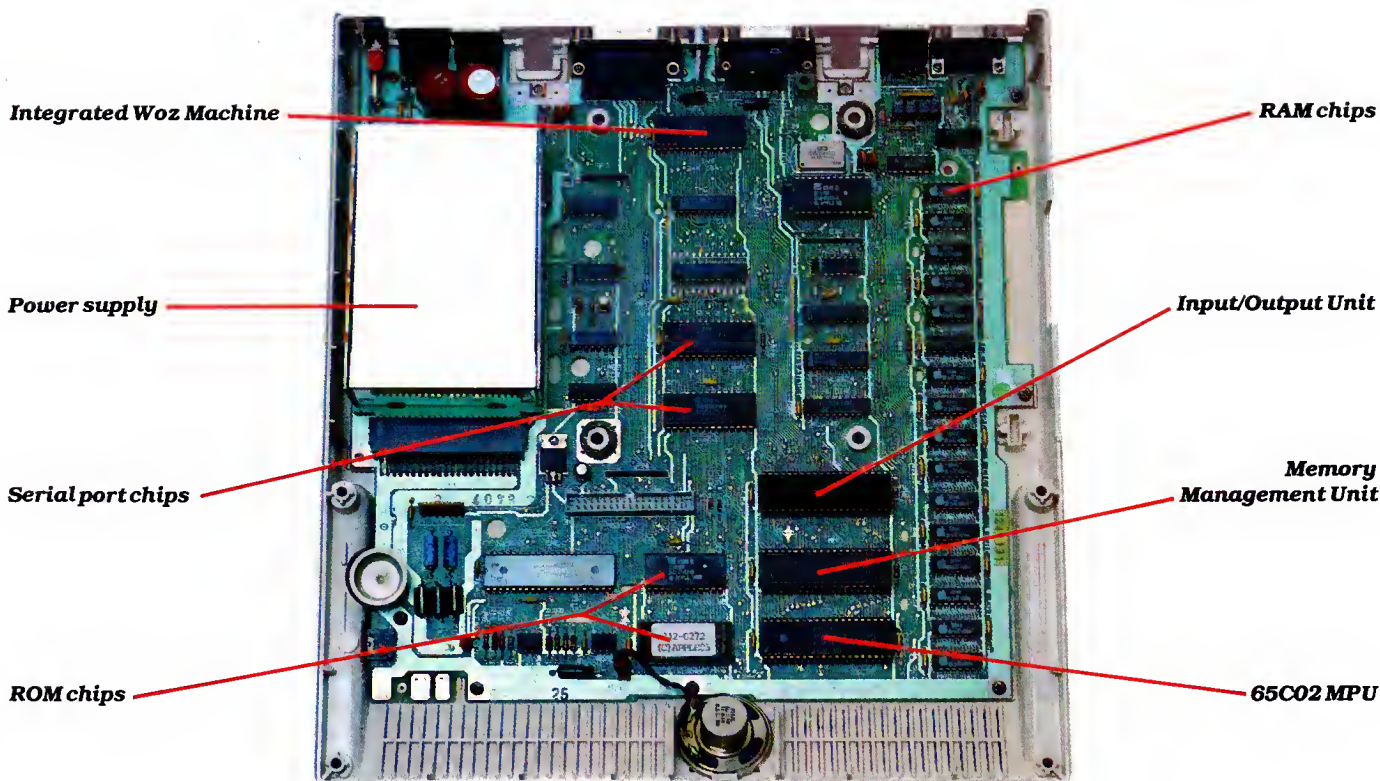
Standard Features: 65C02A MPU, 128K RAM, 16K ROM, 63-key keyboard (Dvorak option built in), one 5 1/4-inch minifloppy drive with 143K formatted capacity, two RS-232C serial ports, one external drive port, one video extension jack, one RCA video jack, one mouse/joystick port, 40/80 column display, three graphics modes (maximum resolution 560-by-192 dots in 16 colors),

Applesoft BASIC, ProDOS, six interactive tutorials, manuals, external RF-modulator and switch box, external power transformer.

Size: 11 1/2-by-12-by-2 1/4 inches, 7 1/2 lbs.

Options: external drive, \$329
Scribe printer, \$299
//c monitor, \$199
mouse, \$99
flat panel LCD,
September availability

The //c will also work with a number of standard Apple peripherals including the Imagewriter printers and the 300- and 1200-baud modems. ■



The Apple //c motherboard.

audio output without driving other members of the household crazy.

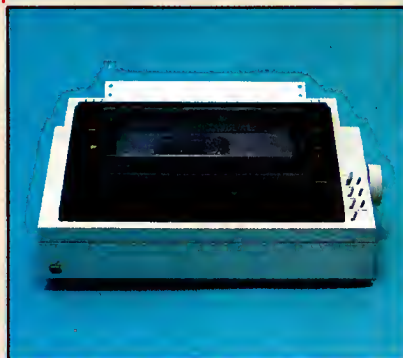
The power supply of the //c is also significantly changed from earlier II models. The internal power supply does not accept an AC input, but rather a 12-volt DC input from the floor transformer that comes with the system. The power supply then converts this 12-volt input into the four different voltages required by the 65C02. The power supply is rated for 25 watts, although the maximum needed by the system is only about 18 watts. The fact that the internal power supply accepts only DC input is significant. It means that the //c will not be limited to accepting power from the external transformer, but will be able to work with any 12-volt DC power source, such as an external battery pack. Without doubt, a third-party company will produce a battery pack for the //c, making the //c the first computer with a disk drive that does not require an AC power outlet.

The last major element inside the //c case is the disk drive. It is a half-height version of the standard Apple II drive, with a formatted capacity of 143K bytes. The internal drive, or more specifically the heat and electromagnetic interference that it produces, was the single greatest concern of the //c design team. They designed the //c to handle their worst case, which Rick Rice of the

design team described as "a long disk sort program in Miami in the summer." According to Apple, the //c will function in such an environment. I hope to have the opportunity to test Apple's worst case in the near future.

Ins and Outs

The keyboard is the primary input device for the //c. The //c keyboard, with one exception, is identical to the //e keyboard. The exception is the reset key, which has been moved from the



The printer that Apple is offering with the Apple //c has been dubbed the Scribe. At \$299, it is a low-cost printer that has some surprising features.

The Scribe is a thermal-transfer printer. You shouldn't confuse it with thermal printers such as the Silentype. It uses a different technology and, unlike thermal printers, it doesn't require special paper. The print-head of the Scribe is a 24-by-24 matrix from which an individual character is formed. When printing, the head moves forward to contact

the ribbon and push it against the paper. The ribbon is then burned onto the paper, forming the character.

The Scribe has two print modes: an 80 cps draft mode and a 40 cps correspondence mode. The quality of print in draft mode is comparable to most dot-matrix printers. In correspondence mode, the output from the Scribe is superior to dot-matrix printers and approaches letter quality.

The Scribe can also print graphics. It can reproduce the contents of the //c's graphics screen. And, as if that wasn't enough, the Scribe can even print in color.

Like the other //c peripherals, the Scribe comes in an attractive cream-colored case. It has a paper holder built in, its power and input cables plug into the sides to avoid interfering with the paper feed, and it comes with tractor feed as standard. The Scribe is a tremendous value. It will find its way into the homes of a lot of //c owners. ■

right of the delete key to a position above the escape key. The keyboard has 63 keys and is a full-sized, professional keyboard.

Above the keyboard, to the right of the reset key, is a switch that toggles the text display between 40 and 80 columns, and a switch that determines the configuration of the keyboard. The standard //c keyboard is QWERTY, but, with a touch of a switch (and some moving of keycaps), the //c keyboard can be changed to a Dvorak layout, which is the secondary layout. Because of this ability to change the keyboard configuration so easily, Apple was able to introduce four overseas versions of the //c on April 24th as well. All that is required to configure the //c keyboard are appropriate character generation ROMs and the corresponding keycaps.

Output from the //c is channelled through the ports on the back of the system unit. Seen from the rear, the first port on the left is a connector for a mouse or joystick. Next to that is a serial port that corresponds to slot #2 on the //e. The next port on the right is a video extension jack. This port can drive an RGB monitor when used in conjunction with an optional external converter. It will also drive the flat panel liquid crystal display that Apple will introduce in the fall. Next to the VE jack is a standard RCA video jack, and next to this a connector for an optional external disk drive. The last port is another serial port. This port corresponds to slot #1 of earlier Apples and is, therefore, the de facto printer port.

The fact that the //c uses ports instead of expansion slots reinforces the idea that it is a consumer-oriented machine. Novice computer users find plugging cables into ports a lot less intimidating than opening a machine and inserting expansion cards.

Options

Apple is selling a number of optional peripherals designed to accompany the //c. A second, external disk drive is being offered, along with a 9-inch green-phosphor monitor. Also available is the Scribe, a new printer from Apple that uses thermal transfer technology (see the sidebar). Perhaps the most interesting product will not be available until September. At that time, Apple will offer a LCD (liquid crystal display) flat panel as an option for the //c. The flat panel will display



Photo 4. The //c keyboard and monitor. Note the new placement of the reset key.



Photo 5. The //c with the monitor in place.

text in 24 rows by 80 columns. As a bonus, the flat panel can also display the complete range of Apple II graphics. Only the fastest game animation will be beyond the capability of the flat panel.

The flat panel will greatly increase portability of the //c, but Apple is not offering one product that is just as important in regards to portability—a battery pack. Apple is leaving the design and marketing of battery packs for the //c to third-party developers. The combination of a //c, a flat panel, and a battery pack will blow machines like the Model 100 and the HP-110 right out of the market.

The //c can also use other Apple II peripherals, such as the Imagewriter printers and the Apple modems. One Apple peripheral that the //c can't use, however, is the ProFile hard disk. Apple limited the //c in this regard to keep a clear distinction between the //c and the //e. Apple will sell the //e as the high-end expandable Apple II computer. The //c, as a consumer machine, does not require all of the capabilities of its older brother.

Third-party hardware will also be

available for the //c, but the variety will be smaller than that available for the //e. This is a logical consequence of the use of ports instead of slots. There is no place to put a clock card or a CP/M card in the //c. Apple is still making plenty of //e's in order to satisfy those people who want more than the basic //c configuration.

Software

The //c runs ProDOS, the operating system for the Apple II that was introduced earlier this year. It will also, of course, run DOS 3.3 software. As a result, the //c should be able to run all of the software available for the Apple //e. Actually, as I mentioned earlier, changes in the //c ROM from the //e have rendered some software incompatible with the //c, but fully 95 percent of the //e software that Apple has tested will run without modification on the //c. This gives //c owners thousands of software programs to choose from.

Apple is supplying some software with the //c. This software is a group of interactive tutorials on five disks that provides new owners with a guide to their new machine. The tutorials are entitled Keyboard Instruction, The Inside Story, Apples at Work, Apples at Play, Introduction to Logo, and Getting Down to BASIC. They are designed to introduce computing concepts in a friendly manner and to inform new computer users of the types and functions of software products available for the //c.

In order to help consumers through the complications of finding the right software, Apple has also inaugurated a "Featured Product" marketing effort in conjunction with a number of third-party software developers. Apple will be making some joint marketing efforts with developers that have products that Apple thinks are good values for the consumer. The participating third-party companies pay a fee to take part in the "Featured Product" program.

End of Part 1

The Apple //c is a fine technological achievement, and I applaud the engineers at Apple who managed to get a computer and a disk drive into a seven and a half pound package. But is the //c the machine that will make people forget the PCjr? I'll examine that question next month in these pages. ■

Russian Word Processor

Victor Svec, a Russian teacher at Phillips Academy in Andover, Massachusetts, is, by his own admission, a "complete computer illiterate." But that didn't stop him from creating what is probably the first Russian word processor on a microcomputer in the country. More Andover students are studying the language now, and they're doing work that astounds the colleges they end up attending.

Svec went shopping for a word processing program that (1) would allow him to create an alternate set of characters, and (2) would be compatible with the school's Apple II's. He finally found what he was looking for in Gutenberg, produced by Micromation in Toronto. After about 200 grueling hours of trial-and-error work in his kitchen, he got his keypad to function exactly as a Russian typewriter. Best of all, a touch of the control key returns him to English.

You can write to Alfie Kohn at 596 Franklin Street, Cambridge, MA 02139.

by Alfie Kohn



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Gutenberg provides a grid on which one can fill in dots to create a new character. His job should have been easy, then. And, indeed, he is the first to admit that "anyone else could have done what I did." But the work was slow going for several reasons. First, Gutenberg was not yet perfectly adapted for the //e. Svec had to figure out how to get the program to treat a blank as a space so it could understand Russian words (rather than just individual characters). He also puzzled out the command to dump his screen—that is, to print his file verbatim.

Printing in Russian was, in fact, an extraordinary challenge. He had to draw each character a second time on a different system, and then synchronize the two so a given key created the same character for each system. This way the printer would understand full characters (rather than just a series of dots). A mini-program he wrote instructs the computer to treat his alternate font as analogous to English.

"They created a system that was so sophisticated that not even they knew all its capabilities," Svec says of Micromation. Subsequent Gutenberg documentation includes the commands he painstakingly discovered. In all, he created 33 Russian letters—upper- and lowercase—plus ten digits and punctuation. Then he re-created each of these for the printer instructions, for a grand total of about 175 characters.

A Well-Kept Secret

His students know almost nothing about how the program works. They just load FONT.RUS to switch the keyboard to Russian, then RUS.MAC to have Russian treated as a language. Those students who were intimidated at the prospect of using a computer were relieved to discover they needed no special knowledge. In fact, any advanced Russian student can be pounding out homework assignments on an Apple within half an hour.

Svec spared his students the complexity of the program for another reason, though. Because they merely follow instructions to boot the program, they don't know how to automatically search out a particular word or flip to a preselected page. Doing so would make homework a little too easy, Svec thinks, so he has no intention of teaching them these instructions. Since students hand in their floppy

disks so he can monitor their progress, he also has neglected to teach them the erase command.

The result of Svec's labors is that students learn better because they can more efficiently correct their assignments. "The quality of writing is significantly higher now," he believes. "They end up rereading an awful lot, and changing things on their own that aren't actually wrong but could be better." Moreover, a short assignment looks even shorter on the screen, so students resort to "shoveling" to fill it out. That's fine, though. "Shoveling in a foreign language is exactly what you want to learn to do."

***"Since its
introduction
last year,
the number
of students
taking
Russian at
Andover has
jumped 25
percent."***

Besides being more efficient, learning Russian has become more fun for the students because of the novelty of using a word processor. It cannot be coincidental that since its introduction last year, the number of students taking Russian at Andover has jumped 25 percent. Another large increase is expected for 1984-85 in a department that currently supports three full-time and two part-time teachers. The school's Russian Club is one of the most popular groups on campus. Students have organized special dinners where no English is spoken, as well as a Russian radio show over the school station.

More Apples Needed

Andover, one of the wealthiest schools in the country, already had a number of Apples for the use of computer enthusiasts. No one had anticipated that foreign language students would be logging on, though, so when they did, terminal time became tight. A supportive parent came through, donating four more Apples for the exclusive use of the Russian department. The department has its own computer room, and a typical evening there will find students on many levels of competence tapping out their papers. The most advanced sometimes lend a hand to those having trouble—something less likely to happen without a central gathering place.

Svec, 30, worked briefly at the State Department before coming to Phillips five years ago. His job includes supervising a dormitory and coaching girls' volleyball, but his first love is teaching students to "learn more Russian than they think they possibly can—and the computer has become a major step towards that."

Svec is using his invention to write Russian dictionaries, as well as novels. The latter are for teaching purposes and can easily be printed out at various levels of difficulty to accommodate different classes. He also plans to offer Russian word processing to author Aleksandr Solzhenitsyn.

If other schools aren't exactly beating down the door to obtain Svec's program, it isn't because of any proprietary interest on his part. "I have no desire to sell it," he said. "I want to give it away." But few secondary schools have a Russian program advanced enough to justify doing word processing. As for colleges, Svec believes pride is involved. "We're producing Russian students who, upon completion of Andover, are already beyond the undergraduate level of Russian at any university that I've come across." ■



Piano Keys



If you don't have a spinet or a grand, tap out tunes on your Apple.

by Daniel F. Dempsey



Piano Keys lets you use your printer to make a two-octave sketch of the black and white keys on a piano. When you place this pattern over the keyboard of an Apple //e, each piano key will cover a computer key. Use these keys with the accompanying sound-producing program to break away from rigid beeps. You can decide, while playing, exactly how long each note would last, just as you would on a real piano. Your Apple piano has a range of five octaves. I wrote the program in machine language, but I have also presented an Applesoft BASIC version.

The Key Sketch

It wouldn't be easy to remember 24 computer keys selected to represent a two octave span of piano keys. You can avoid this difficulty by running Key Sketch (**Listing 1**) on your printer. Use normal spacings of six lines per inch and ten characters per inch of line. Before running, leave at least three inches of paper sticking out of your printer; after running, be sure that you don't tear off the paper any

closer than three inches to the sketch just printed. Now turn the sketch sideways to see the familiar black and white piano key pattern covering a length

of 10.5 inches. When you place these piano keys on top of the upper two rows of computer keys, you will need the extra three inches of paper, left and right, to extend down along the computer's sides. Use five-inch strips of tape to attach these paper extensions to the sides.

The next step will keep the piano

Address correspondence to Dr. Daniel F. Dempsey, Professor of Physics, Canisius College, Buffalo, NY 14208.

Listing 1. Key Sketch.

```

10 A$ = "#####|_____|"
20 B$ = "#####|_____|"
30 C$ = "#####|_____|"
40 D$ = "#####|_____|"
50 E$ = "#####|_____|"
60 F$ = "#####|_____|"
70 G$ = "#####|_____|"
80 H$ = "#####|_____|"
90 I$ = "#####|_____|"
100 REM USE 20 SPACES FOR S$
110 S$ = " "
120 GOSUB 300: GOSUB 240
130 GOSUB 170: GOSUB 170
140 GOSUB 280: GOSUB 310
150 GOSUB 240: GOSUB 220
160 GOSUB 280: END
170 PRINT S$;G$: PRINT S$;A$
180 PRINT S$;G$: PRINT S$;I$
190 PRINT S$;F$: PRINT S$;F$
200 PRINT S$;E$: PRINT S$;F$
210 PRINT S$;H$
220 PRINT S$;G$
230 PRINT S$;A$: PRINT S$;G$
240 PRINT S$;I$: PRINT S$;G$
250 PRINT S$;G$: PRINT S$;D$
260 PRINT S$;G$: PRINT S$;H$
270 RETURN
280 PRINT S$;F$: PRINT S$;B$
290 RETURN
300 PRINT S$;C$
310 PRINT S$;F$: RETURN

```

keys from intertering with each other. Use a sharp blade to make a continuous horizontal cut separating the black key region from the white key region. Then cut along the 29 short vertical lines. Every key will then be a flap with three free edges and one hinged edge. For best results all your cuts should be two very closely spaced cuts.

You will need to access some other computer keys. For selecting ranges, X gives mid range, Z gives low, C gives high and V is very high. You could cut out a single rectangular slot exposing all of them or make four flaps. Make small holes over SPACE, RETURN and N (used in RUN) so they can be accessed using a pointed instrument. If you use the name PNO when saving the sound producing program (**Listing 2**), then all the keys in RUN PNO are accessible.

Run off a number of sketches. You can use them in different ways. You could label each key with a letter or a number to aid a beginner, or have comments with arrows pointing to

certain keys. You'll find plenty of writing space.

Generating Notes

The Apple //e Applesoft Tutorial states that every time a program executes the statement SOUND=PEEK (-16336), the speaker produces an audible click. A rapid sequence of such clicks generates a tone. Frequency and duration values are usually built into a program. Properly selected values for frequency lead to tones which match those of a piano. Value choices for duration determine how long each tone lasts, but the rigidity of such fixed duration tones leads to sounds usually described as beeps. What I set out to do was to produce piano matching notes that could be controlled at every instant and thus be as short or as long as I wanted. After all, at a piano, one sometimes feels like stepping up the tempo or, near the tune's end, stretching out the final few notes.

A mid-range note like the A above middle C requires 440 clicks per second. The highest note I wanted to include called for over 2500 clicks every second. The usual approach is to have the computer carry out a counting op-

eration to use up the right amount of time between each click and the one following it. I realized that simple counting is not the most efficient use for the time between clicks. Since any operation a program calls for will use up time, you could ask the computer to see if the last key down is still down, if it has been let up and a new one is now down, if a musical rest is in progress, or if a different range has just been selected. All this monitoring can happen between clicks. With more than 2500 clicks per second, could there possibly be enough time between successive clicks for the computer to check up on all these things? Yes! Machine language programs run so fast that the computer can complete everything required and still have time to spare until the next click. The right amount of spare time varies with each note, so I fine-tuned each note with a counting sequence.

The Machine Language Part

Listing 3, Between Clicks, gives the main machine language program with its assembly language counterpart. Each time \$37D is executed the speaker is accessed. A jump follows to \$345 where the outer loop parameter

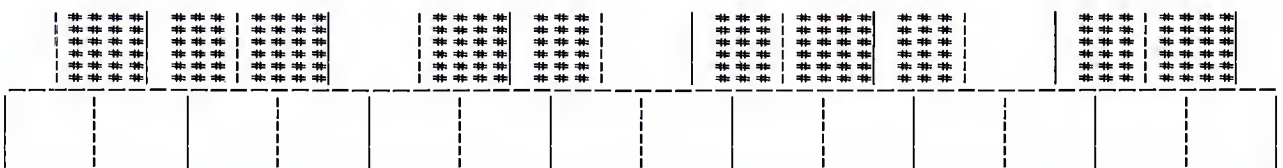
Listing 2. PNO.

```

10 FOR L = 832 TO 864: READ D: POKE L,D: NEXT : DATA
   169,4,141,202,3,172,202,3,173,16,192,16,251,173,
   0,192,201,86,240,76,201,67,240,80,201,88,240,84,2
   01,90,240,88,201
20 FOR L = 865 TO 906: READ D: POKE L,D: NEXT : DATA
   32,240,92,162,0,221,0,3,240,8,232,224,24,240,216
   ,76,102,3,189,32,3,170,202,208,253,136,208,6,173,
   48,192,76,69,3,234,234,76,136,3,76,72,3
30 FOR L = 928 TO 960: READ D: POKE L,D: NEXT : DATA
   160,1,140,202,3,76,100,3,160,2,140,202,3,76,100,
   3,160,4,140,202,3,76,100,3,160,8,140,202,3,76,100
   ,3,96
40 FOR L = 768 TO 791: READ K: POKE L,K: NEXT : DATA
   92,127,93,61,91,80,48,79,57,73,56,85,89,54,84,53
   ,82,69,51,87,50,81,49,9
50 FOR L = 800 TO 823: READ P: POKE L,P: NEXT : DATA
   27,26,26,25,25,25,25,25,26,26,27,28,30,31,33,35,
   38,41,44,47,51,56,60,66
60 CALL 832
70 END

```

Figure. The piano keyboard.



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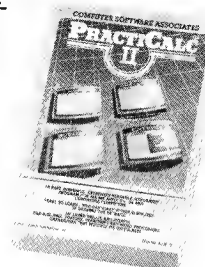
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Y takes on the value 1, 2, 4, or 8, depending on whether the most recent range choice (stored at \$3CA) was highest, high, middle, or low. Each doubling of Y drops all the notes of the

Listing 3. Between Clicks.

```

0340- A9 04 LDA #04
0342- 8D CA 03 STA $03CA
0345- AC CA 03 LDY $03CA
0348- AD 10 C0 LDA $C010
034B- 10 FB BPL $0348
034D- AD 00 C0 LDA $C000
0350- C9 56 CMP #56
0352- F0 4C BEQ $03A0
0354- C9 43 CMP #43
0356- F0 50 BEQ $03A8
0358- C9 58 CMP #58
035A- F0 54 BEQ $03B0
035C- C9 5A CMP #5A
035E- F0 58 BEQ $03B8
0360- C9 20 CMP #20
0362- F0 5C BEQ $03C0
0364- A2 00 LDX #00
0366- DD 00 03 CMP $0300,X
0369- F0 08 BEQ $0373
036B- E8 INX
036C- E0 18 CPX #18
036E- F0 D8 BEQ $0348
0370- 4C 66 03 JMP $0366
0373- BD 20 03 LDA $0320,X
0376- AA TAX
0377- CA DEX
0378- D0 FD BNE $0377
037A- 88 DEY
037B- D0 06 BNE $0383
037D- AD 30 C0 LDA $C030
0380- 4C 45 03 JMP $0345
0383- EA NOP
0384- EA NOP
0385- 4C 88 03 JMP $0388
0388- 4C 48 03 JMP $0348
038B- 00 BRK
038C- 00 BRK
038D- 00 BRK
038E- 00 BRK
038F- 00 BRK
03A0- A0 01 LDY #01
03A2- 8C CA 03 STY $03CA
03A5- 4C 64 03 JMP $0364
03A8- A0 02 LDY #02
03AA- 8C CA 03 STY $03CA
03AD- 4C 64 03 JMP $0364
03B0- A0 04 LDY #04
03B2- 8C CA 03 STY $03CA
03B5- 4C 64 03 JMP $0364
03B8- A0 08 LDY #08
03BA- 8C CA 03 STY $03CA
03BD- 4C 64 03 JMP $0364
03C0- 00 RTS
03C1- 00 BRK
03C2- 00 BRK
03C3- 00 BRK
03C4- 00 BRK
03C5- 00 BRK
03C6- 00 BRK
03C7- 00 BRK

```

Listing 4. Access, Access, Click.

```

10 FOR T = 1 TO 1000: NEXT T
20 PRINT "ACCESS THE SPEAKER"
30 SOUND = PEEK ( - 16336)
40 GOTO 10

```

"While just about everyone relates well to music, the same thing can't be said about machine language."

highest range down one octave. The two lines preceding \$345 are used only when beginning the program. They store a range value of 4, which gives the middle range—the one whose lower octave contains middle C.

The two lines following \$345 involve a check to see if a key is held down and a looping action between these lines if there is no key down. That is how the musical rests are accomplished. As soon as any key is pressed the program exits this loop and, at \$34D, reads the ASCII value of the pressed key. It then checks this value against those of the four ranges and changes ranges if necessary. It checks to see if the space bar (\$20) was pressed to end the program.

The lines beginning at \$364 call for a step by step check, using ASCII values of stored key data (K) to match the key being pressed. If a match is found, line \$373 provides the appropriate note parameter (P) from stored data. That value times the duration of an inner loop using lines \$377 and \$378. Lines \$37A and \$37B see if the outer loop is to continue or end. If it ends, the speaker is accessed. If it is to continue, then branching to lines beginning at \$383 will use up enough additional time so that both forms of outer loop, continuing and ending, are identical in time.

Fine Tuning

The Apple //e uses a 6502B microprocessor as its central processing unit. It runs at a clock rate of 1.022727 MHz and each clock cycle occupies a specific length of time. Knowing the number of clock cycles used for every line of assembly language, I worked out a formula which added up all the millionths of a sec-

ond. The formula told me the note frequency the computer would play for any P value selected. The note frequencies of the computer matched the required piano frequencies to within a fraction of a percent in every single case. I checked the theoretically obtained notes against a standard six-note pitch pipe and against the A-440 Hz note broadcast by the National Bureau of Standards on station WWV. I couldn't ask for better sounding agreement.

The formula isn't given here (most people are not interested in formula derivations), but I'll be happy to provide it upon request. One thing about the derivation was very interesting. The notes it supplied were all off by exactly an octave, a factor of 2. It took me quite a while to discover that, contrary to what the *Tutorial* states, a click does not occur every time the speaker is accessed, but every other time. Take a moment to demonstrate this for yourself by running Access, Access, Click (**Listing 4**). Listen at the left end of the computer while watching the screen. Every other access gives the click.

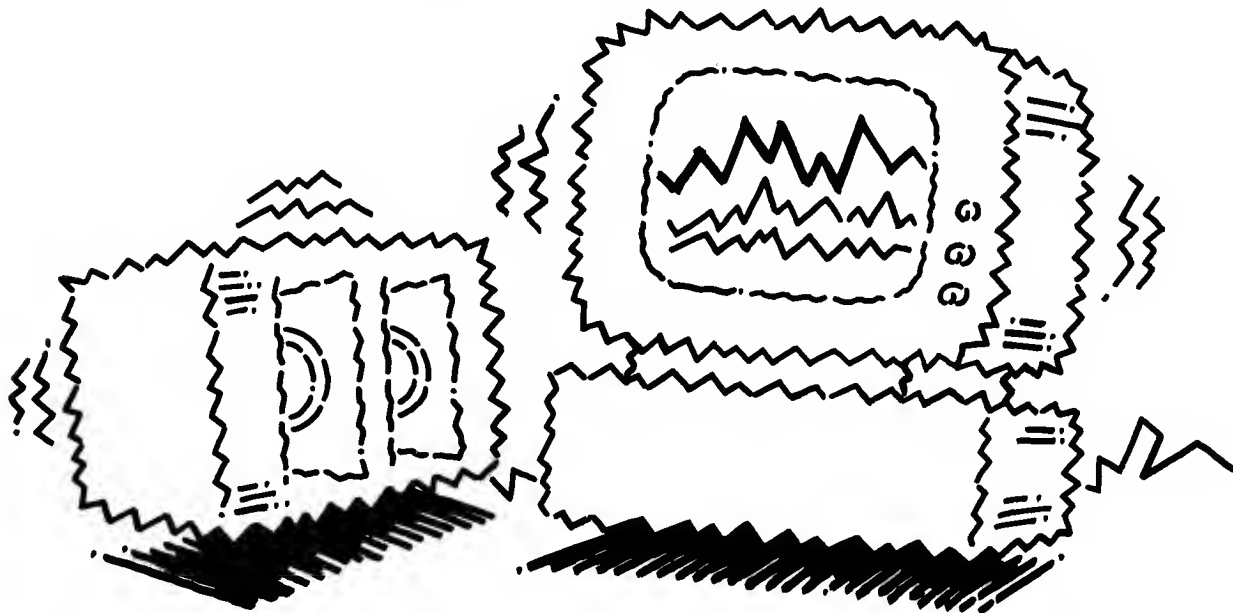
Making Things Easy

While just about everyone relates well to music, the same thing can't be said about machine language. **Listing 2** is given entirely in decimal form to make things easy. Lines 10, 20, and 30 are exactly equivalent to the main machine language program. To see this if you aren't familiar yet with hexadecimal numbers, remember that hexadecimal and decimal numbers are the same up to 9. Now check how the machine language program starts off: A9 04 8D . . . Compare this with the data entries in line 10. In each case the second entry is 4, the fifth entry is 3, and the eighth entry is 3. Decimal 832 is equivalent to hexadecimal \$340, so CALL 832 in program line 60 gets us line \$340 in the machine language program. The data in lines 10, 20, and 30 are given the symbol D, standing for decimal equivalent.

The two-octave keyboard covers the range of most songs. Simply change the range one octave when you're working at the extreme ends of the keyboard to avoid the awkwardness you'd find with a one-octave keyboard.

Can everything really be so easy? Not quite. It isn't easy to decide which song to try first. ■

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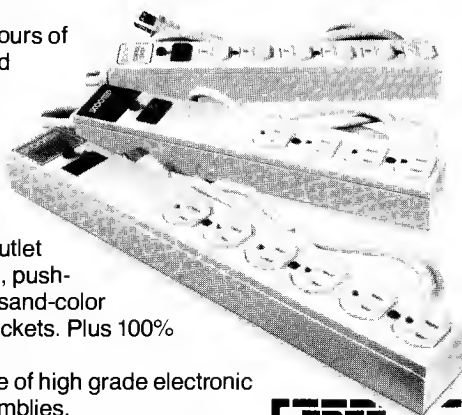
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I-0784

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HOW I SURVIVED A TAX AUDIT

He thought the bad news was over when he got his
draft notice. Little did he know that more danger
lurked in the mailbox.

BY FRED HUNTINGTON



One event that truly frightens me is dealing with the IRS. I wouldn't intentionally do *anything* that could get me in trouble with them.

You can imagine my panic, then, when I got a courteous letter inviting me to the IRS building in Visalia to pass the time of day. They called it an audit. I called it the end of the world. The Internal Revenue Service wanted me to prove to them that my purchase and use of a computer a couple of years ago was really a necessary thing to me in my position as a school principal. Since we didn't have an option of whether or not we wanted to attend the audit, my wife and I reluctantly took off from work.

I still remember the long drive to the IRS office, discovering the obscure

brick building set back off Mooney Boulevard, which we had never even noticed before this. We parked our car and, with a great amount of apprehension, entered the air-conditioned building. (It was in the middle of the summer.) We met our auditor, exchanged the usual polite small talk about how hot it was, and then got into action. He was very friendly and professional. We came to a mutual understanding on a separate unrelated minor point that was included in the audit and then we got into the nitty-gritty, the deduction and tax credit for the computer.

Fred Huntington obeys Federal regulations at P.O. Box 787, Corcoran, CA 93212.



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Naturally I thought the use of the computer was important, and predictably the IRS did not think my use of the computer was necessary. Not one to give up easily, I calmly told the gentleman doing the audit that I had used my computer to help me run my school. I did such wonderful things as write a yard-duty schedule program. That didn't seem to matter to him.

Doesn't Style Count?

He said that it may have been helpful but that it was not necessary. I said that for my style it was necessary. We went round and round on that one.

I told the auditor that when the first accountant used an adding machine, it was not necessary to his job—he still could have done the work with paper and pencil. I suggested that the first adding machine would be tax deductible.

He told me that it would not have been tax deductible.

Defeated, I gathered my things together and left, knowing that I had hit an absolute dead end. He politely told me that he would review the material

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I presented but that he was not too optimistic for me.

The next day (I didn't even know the mail service was that fast) I received a form letter from my friendly IRS auditor saying in effect, "Nice try, Charlie, but no dice." Semi-undaunted, I called the Visalia IRS office and said, "I want to appeal. Set me up an appointment," which they did.

Several months later, my wife and I again took off from work and trudged back to Visalia where we were again told by the same auditor that the computer was not really a tool of my trade. Alas, I had even brought a letter from my superintendent saying how important it was to me in my work. The reason I had the computer, they said, was to get ready for my subsequent computer business that I was going to have in the next year and that it would be a legitimate write-off in the years to follow.

Again we went round and round, each using the same arguments we had used previously, both maintaining our cool but each becoming more and more perturbed at the other. I

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wanted to ask him if he was working on a commission. Luckily common sense returned to me and I refrained from any such gibes.

At one point I had him confused enough to go ask someone else's opinion. Actually I wanted to ask someone else's opinion myself, because I was sure that my auditor could not relay the emotional impact of my argument quite as well as I could.

After about five minutes, he came back beaming, knowing he had made the right decision—much to my chagrin. He did ask to see my receipts, which he took to the other room to make copies. After about ten minutes he came back, said that I didn't have a case, and returned my receipts to me.

One thing I thought was interesting about this whole ordeal was that he never questioned me about my receipts. I was anticipating some trouble. Some receipts showed purchases for such items as Space Invaders, Bill Budge's Trilogy, I Ching, and Super Star Wars. I knew that it would have been hard to prove that these games were for school use, but I had a legiti-

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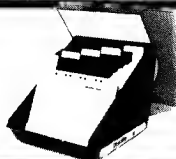


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mate plan that would validate their use at school.

Before I left, I asked him for an appointment for an appeal, thinking that that might be just a mite intimidating. It wasn't. I didn't have any more local appeals. San Francisco was the next round.

San Francisco is more than four hours away from my home. Luckily a traveling auditor came to Fresno (only an hour away) every three months.

The Next Round

It took a year to get an appointment. I was beginning to think that they had forgotten about me. I had forgotten that the IRS has computers too.

My wife and I each took yet another day off from our respective jobs. This time, glory be, we had someone new.

Fearing jail, confiscation of my Apple, or even public branding, I was totally prepared this time. After introductions were made, I whipped out of my wife's briefcase a collection of suspension papers that I had produced this last year on my computer. It used to take me 30 minutes to complete all

\$
the paperwork to suspend a child. Now it takes me only 30 seconds (15 if it's the second suspension). Confidently, I told him how my paperwork has been cut way down, how all my staff bulletins are done on my computer, and how I help my secretary figure out attendance figures in a twentieth of the time.

Very good, he said, but was it ordinary and necessary? He thought he had me.

Nervous but confident, I whipped out my latest IRS regulations and read him the section that says the taxpayer shall be the one to decide if the item is ordinary and necessary. He graciously agreed with me.

The rest was easy. I conceded that I indeed did not use the computer entirely for business (not in 1978 anyway). At least 75 percent was business and the rest pleasure. He bought that and we were both happy. My personal computer now sits in my school office, used all of the time only for school business. (I now have a computer at home that I can use for games.)

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Hopefully things have changed enough in the last two years that computers are now considered ordinary and necessary for many applications, even by the IRS. If you do have a problem with the IRS and you feel you have a legitimate deduction that you can't get recognized, the only thing to do is appeal, appeal, and appeal. Someone somewhere will finally believe you.

You must, of course, always tell the truth, and never attempt to shade it, even a little bit. It's also important to get yourself a good tax person, preferably one who has a personal computer at home.

The Reward

The most important step, after you get your deduction, is to explain to your spouse that the IRS gave you this deduction only on the condition that you go right out and spend it on additional computer products so that you can have more deductions for next year's tax and thus save even more money.

After all, it's the American way. ■

Circle 49 on Reader Service card.

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by Prof. Jones

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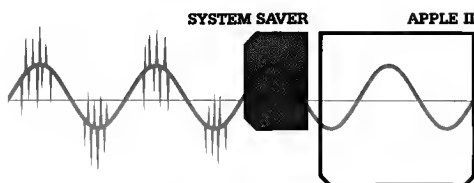
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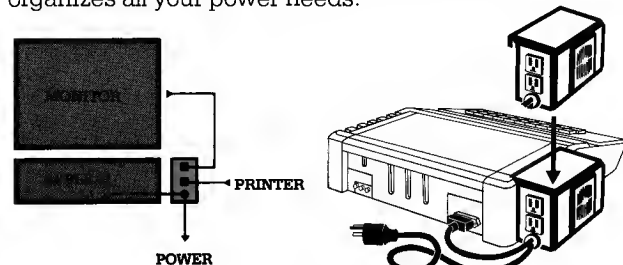
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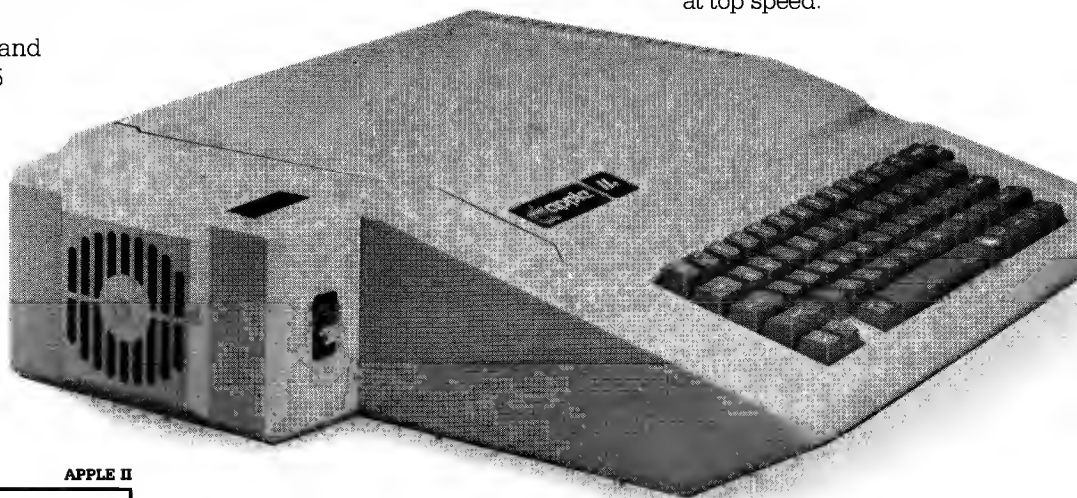
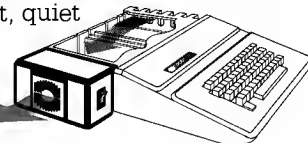


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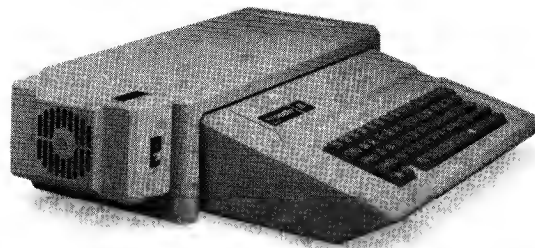
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**Tired of being
glued to your
desk? Get it
together with
Apple's handy
desktop
organizer.**

by Archie Mason

The desk is covered with files. The scissors and paste pot are there somewhere. The important letter, intended to contain parts of a customer listing and fragments of your financial report, is now due. You must create the letter and include 22 customers with their addresses, phone numbers, monthly purchases, and contact people. Then, you'll add the last six-month balance sheet plus an outlook for the next six months.

Before you go any further, put everything away. All you need is an Apple IIe and a new software package from Apple called AppleWorks.

Apple has done it again. They surveyed the marketplace to see how people work at their desks, and produced a program that suits these needs.

AppleWorks is excellent. It is essentially a desktop organizer with access to three basic, well-integrated programs: a word processor, a data base manager, and a spreadsheet program. AppleWorks even has a bit of "windowing," which is the latest buzzword on the software scene. As you go through successive levels of well-planned menus, the route back through them appears on the screen as one index card of options laid down in front of another with the tab showing above it.

You are never lost, since the options are spelled out on the bottom of the screen, your file is identified, the amount of memory left "on the desktop" is indicated, and the help screen is only a keystroke away.

Let's look at each of the modules as a separate entity and then see how they hook together. This merger is what makes AppleWorks such a joy, especially since the commands for various actions are the same in each module. This means, for example, that when you learn how to save a file in one module, you will know how to save a file in every module.

The Word Processor

This is a complete word processor, not a limited text editor as so many other programs are. It has the usual inserting and deleting capabilities, but features sophisticated functions such as block move, search and replace, and automatic page headers and footers with page numbering. The program also supports boldface, super- and subscripts, and proportional spacing. Entering text into word processing is a breeze, with an uncluttered screen and none of those

Write to Archie Mason at 10 Dzamba Grove, Stamford, CT 06903.

endless control character tables taking up half the space.

The document is printed just as if on a typewriter, except that AppleWorks takes care of word wrap at the end of lines automatically, so that new text is always neatly handled. Correction and amendment are easy, and the document on the screen appears almost as it will look on paper. One of AppleWorks' nice features is that if you move the cursor to an embedded character, a legend appears at the bottom of the screen to remind you which of the options it represents.



Data Base Management

Since the control of data is always menu driven, data base management is an excellent AppleWorks function. If you want to sort your data base, change the presentation order from the original numerical order on customer number to, for instance, alphabetical order by last name of the contact person. With just a few keystrokes, the re-ordered data appears on the screen. You can edit the information in your data base from virtually anywhere, and the updates are immediate. No complicated re-indexing or other procedures are required.

The capabilities are large enough for almost any company or for personal use. You can have a maximum of 30 different fields in a record, which is the main sub-category of data, such as a person, an inventory item, or a phone record in your collection. These can be numerical or alpha characters. If they are numerical characters, AppleWorks can create a field by calculating math on up to three other fields.

One nice feature is that if you use the words *date* and *time* in your field names (such as BirthDATE or ArrivalTIME), AppleWorks converts these entries to a standard format. For instance, any way you enter a date (6,12,84 or 6/12/84 or 6-12-84 or even 12JUNE84) it goes into the file as JUN

12 84. Times are handled similarly, assuming that the time occurs during business hours unless you tell it differently by adding A for a.m. or P for p.m. You can sort on these fields too, and AppleWorks will manage all the odd things that might occur. A month-only indication will be treated as zero days and be placed before another entry that is assigned a day-date (May 84 will appear before May 10 84).

The reports generated from a data base are simple to manage, although somewhat limited in format. You can have two types of reports—table or label. The tabular report lists selected fields from the data in columns with each numbered page headed with the file name and the name of the particular report. The second format, labels, is more than mailing labels. It formats selected fields as separate entries in a horizontal layout, so index cards, inventory item labels, or any other summary information from the data base can be created.

Each data base file specifies up to eight report formats to be called by name at a moment's notice. If you have a favorite format in one file, you can copy it to another data base to suit the new file.

The data base manager is simple, yet comprehensive. While it does not possess the capacity of a more sophisticated program (the maximum number of 75 character records in a file is 250 if you have 64K memory, 850 if you have 128K), it is plenty for a small business. The limiting factor is the memory, so creative splitting of data bases (A to M, N to Z, or separate files for different geographic regions) can offset possible size problems.

The Spreadsheet

Although the maximum size of a matrix is smaller than familiar programs such as VisiCalc, and is limited to 1800 cells with 64K or 6000 with 128K, it is more than adequate for a small business or personal environment. And mention of VisiCalc is apropos. If you have ever used VisiCalc you won't have much trouble with the AppleWorks spreadsheet, because many of the commands and the formulae structure are the same or so similar that you'll remember them quickly.

Some of VisiCalc's annoying limitations have vanished in AppleWorks. For example, a long label will naturally overflow but be shown in full when the cells to the right are empty, reducing the amount of typing involved for a heading. Other features appearing in competitive spreadsheet programs, such as SuperCalc and Lotus, are present in the AppleWorks spreadsheet. It has the ability to protect cells from inadvertent change and the automatic insertion of commas in thousands. Also, selecting options by moving the highlighting cursor across the options with the arrow keys and hitting return to accept them is great.

But there are a few odd things I found difficult to implement. Setting column width is weird. You add a character to each column by tapping the right arrow, and subtract a character from each with the left arrow. Unless you are counting, the screen does not show you how many characters of width you have. This is surprising, since the in-screen prompts are usually comprehensive.

Several actions require many keystrokes, whereas in other spreadsheets they tend to be simpler. The equivalent of shift-> GOTO a specific cell in VisiCalc is clumsy in the AppleWorks spreadsheet. You first hit Open Apple-F, for FIND, then move the cursor to choose between REPEAT LAST, COORDINATE, and TEXT. If it is a new coordinate, then you must eliminate the coordinates of the last one you went to (which automatically appears) by spacing it out, type in the new one you want, then hit return.

However, to counter this, the FIND TEXT option allows you to search your whole matrix for a label string that will take you to every label string until you find the one you want. When it runs out, it tells you that, too!

One of the most wanted spreadsheet features is available in AppleWorks—the ability to sort rows of the matrix by alpha or numeric. This is a powerful capability and welcome in virtually all environments.



Tying It All Together

This is where the true power of AppleWorks comes into play, since it has the ability to use data and text created in any of the modules. Once you have tried the feature, you will wonder how you ever did without it!

AppleWorks pauses on command, offers you a menu or two to locate your selected file, helps you cut out the section you want to transfer, puts it on a "clipboard," gets you back to the original process, and then unclips it and pastes it in the right place.

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The Manual and the Tutorial

The manual is excellent with two main sections, the tutorial and the reference manual. The tutorial is used with the tutorial disks and provides an in-depth, step-by-step progress through the program functions. Both the tutorial and the reference manual have extensive indices and easy-to-follow contents list pages.

There are five disks in the package. Two are entitled *Apple Presents AppleWorks*, Volumes 1 and 2. This is a beautifully organized tutorial to lead you through each module's function and integration. It is a little patronizing, however, since it will not allow you to use a single bit of creativity.

Another disk contains sample files, so that after the tutorial you can create your own stuff. Finally, there are the two disks you need to get started—the start-up disk and the program disk. And these you will use a lot! Yes, one of the problems is the amount of swapping involved if you have only one drive. While this small negative point is offset by the tremendous integration benefits, if you had any hesitation about adding that second drive, this will tip you over the edge.

AppleWorks sells for \$250, and is manufactured by Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014. ■

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The Compleat



Text File Primer

Part 5—Sorting

by Lee Swoboda

In the first four parts of this series I've explained the mechanics of storing and recalling text. In the remaining three parts, I will examine methods of creating text.

When we create a text file, we do so in chronological order—the order in which the data is available. Generally, we use text in logical order—alphabetically or numerically. The process of creating ordered text from unordered text is sorting. I will focus my discussion on sorting into ascending alphabetical sequence, since that is the most common, but the principles are the same for descending and numerical sorts. The concept of sorting is simple—arrange data in ascending or descending alphabetical or numerical order. The methods of achieving that objective are virtually infinite. Those methods range from relatively simple schemes (bubble sort) to quite complex (quicksort). All schemes are based on the computer's ability to perform Boolean algebraic (true/false) operations. This is where BASIC's flexibility works to our advantage. The popularity of BASIC is due to the ease with which it is learned and, of course, to its being "free" with most personal computers. The language would not have gained such popularity if it did not allow a wide variety of applications,

particularly business applications. Most business applications require some simple numerical operations, but primarily text operations. Thus the ability of BASIC to build and compare strings becomes vital. BASIC allows us to write statements such as `IF "XXXXX" > "YYYYY" THEN PRINT "TRUE"` without having to resort to comparing strings byte by byte at the machine language level as we must in some languages, such as FORTRAN. This simplifies the process of writing sort algorithms in BASIC, although this convenience is not without a price. Sorting in BASIC is often very slow.

The speed or effectiveness of sorting ranges as broadly as the schemes for sorting. The effectiveness of any specific sort method is measured in terms of the speed with which that method sorts a given list of variables. The speed depends not on the complexity of the method, but on the number of times that the computer must com-

*Here are
five ways
your computer
makes lists
of data
tidy.*

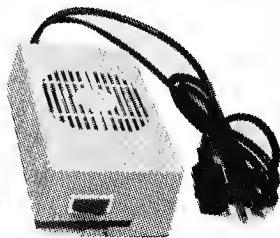
pare and exchange elements of data. This problem is accentuated when the data being sorted are strings, because every time BASIC exchanges strings, it creates "garbage" which must later be "collected." So between this garbage generation and the slow speed with which BASIC

handles strings, the speed of various sorting methods in BASIC varies dramatically, as we shall see.

Using machine language sorting routines called from BASIC speeds the process significantly because machine language operates much faster than BASIC, because it handles strings more efficiently, and because it does not create garbage. Whether we are sorting in BASIC or machine language, however, the sorting method will affect the speed. To complicate matters further, the same method is

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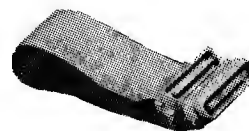
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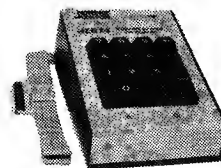
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not equally effective for all numbers of elements nor for all arrangements of elements. To clarify, I will examine several sorting algorithms in BASIC and their relative effectiveness.

Types of Sorts

Sorts are of two types: exchange or binary. Binary sorts are more complex to code, but also more efficient. I will discuss five sort algorithms—two exchange, and three binary. The exchange sorts are bubble sort and insertion sort. The binary sorts are Shell sort, tag sort, and quicksort.

Exchange Sorts

The exchange sorts are simple, at least in concept: Go through a list of items and exchange any elements that are out of order. Since the computer can compare only two elements of the list at one time, the list is analyzed in pairs. This means that the computer must go through the list enough times to arrange all the elements in order. The comparison and

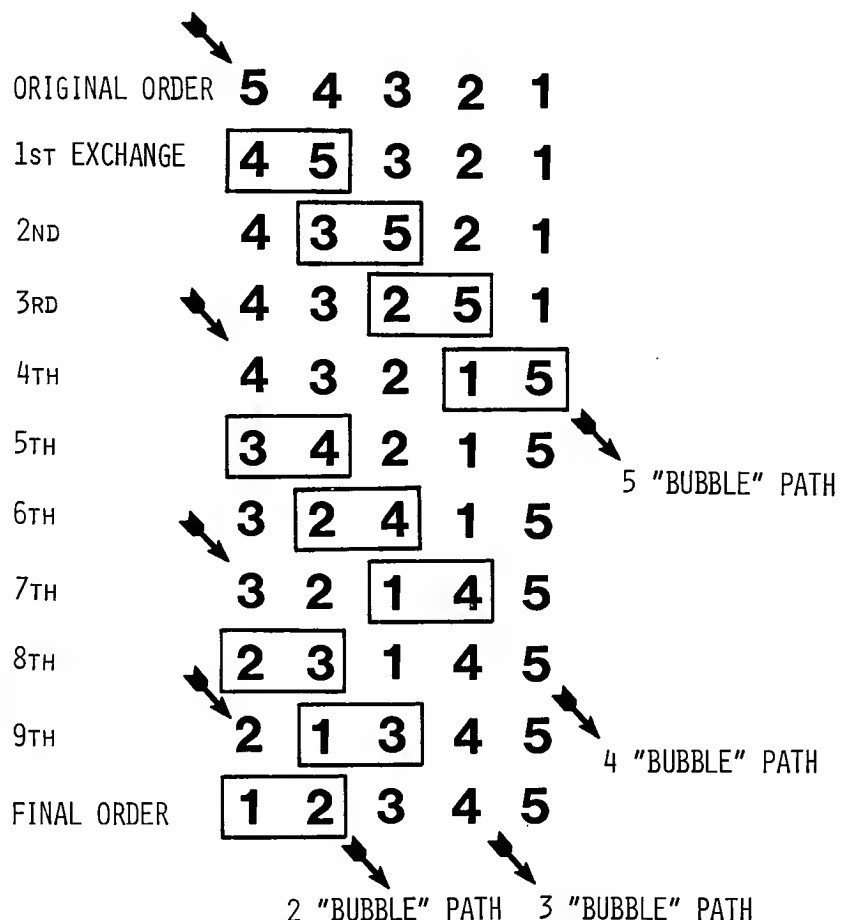
exchange of two elements in a list is what characterizes the exchange sort. How the program decides that it has sorted all the elements correctly determines the number of times the computer must go through the list and therefore the efficiency of the sort algorithm.

I'll illustrate a simple exchange sort. Start with five bags containing one, two, three, four, and five pounds of jelly beans (about a million calories, but that's immaterial to our study). Arrange them in descending order. A simple exchange method sorts them into ascending order. The starting order is:

5 4 3 2 1

Start at the left side comparing the bags in adjacent pairs. If the two bags in the pair are out of order, exchange them. Move from left to right comparing and exchanging adjacent pairs of bags. When you reach the right side of the list, begin again and repeat the process until all the bags are in correct order by weight. The first two steps in

Figure 1. The exchanges used in bubble sort.



the process would be as follows:

COMPARE: 5 4 3 2 1

EXCHANGE: 4 5 3 2 1

COMPARE: 4 5 3 2 1

EXCHANGE: 4 3 5 2 1

Figure 1 shows the exchanges necessary to sort the bags into ascending order. For a dramatic illustration of this process, enter and run **Listing 1**. The program will duplicate the matrix in **Figure 1**.

In these examples, note that "5" is sorted into place first, then "4" and so forth. One can visualize the elements as "bubbling" through the list, hence the name for the algorithm used in **Listing 1**, the bubble sort.

Listing 2 demonstrates the bubble sort graphically. Enter and run the program. The computer will display a diagonal line of low-resolution graphic blocks from the upper left to lower right corners of the screen. It will scramble the blocks and re-sort them back into the diagonal line. Notice that the lowest block will move into place first, then the next block, and so forth. Again, this is the bubble pattern. Notice also that the process takes 778 moves. That's a lot of movement just to sort 40 blocks and is the reason that the bubble sort is so inefficient.

Sort Algorithms and Benchmarks

The efficiency of sorting depends on four major factors: the sorting method (algorithm), the number of items to be

Listing 1. A demonstration of bubble sort.

```
10 HOME
20 PRINT TAB(10)"SORT DEMONSTRATION"
30 PRINT TAB(10)"-----"
40 PRINT
50 PRINT TAB(10)"0" TAB(15);
60 FOR I = 1 TO 5
70 A(I) = 6 - I
80 PRINT A(I); " ";
90 NEXT I
100 PRINT
110 NR = 5
120 FOR I = 1 TO 4
130 L = NR - I
140 FOR J = 0 TO L
150 IF A(J) <= A(J + 1)
160 GOTO 200
170 T = A(J)
180 A(J) = A(J + 1)
190 A(J + 1) = T
200 N = N + 1
210 PRINT TAB(10)N TAB(15);
220 FOR M = 1 TO 5
230 : PRINT A(M) " ";
240 NEXT M
250 : PRINT
260 NEXT J, I
```

Solutions to inCider's inSidious inSolubles, from page 51

The Banker's Dilemma

Change all G\$ variables to G. The string causes the variables to be alphabetized (read from left to right) rather than determining their numerical value.

The Wayward Timer

Formatting errors are the chief problems here. Let's start with the easiest.

Add : NORMAL : SPEED = 255 to line 70 to put things back together. To stop the timer from scrolling off the screen when the program terminates, change line 80 to VTAB 23.

Finally, we must get rid of the unwanted zeros that remain as we decrement the counter. It would be easy to do this by changing line 60 to VTAB 1 : HTAB 36: PRINT I; " ". However, things still don't look quite right. Can you eliminate the unwanted white spaces after the zero?

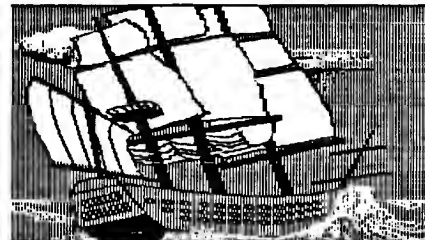
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sorted, the arrangement of the data prior to sorting, and the efficiency of the programming language.

All right, so the bubble sort is easy to program, easy to understand—and slow. But how slow is it? Or perhaps more important, which algorithms are faster? To answer that question, we need to conduct some benchmark testing of different algorithms for different sizes and arrangements of lists.

First we need a list. Since the idea of sorting is to change random lists to ordered lists, the starting list should be as random as possible. **Listing 3** uses the Applesoft RND command to generate 2000 five-letter "words" for the computer to sort. These words are saved into a text file to assure that each algorithm is sorting the same list—that we are comparing apples to apples, so to speak.

The list of words is not truly random, since the RND command repeats itself quite frequently (see "RND Is Fatally Flawed" in *Call A.P.P.L.E.*, January 1983). However, for our pur-

poses, the resulting list is good enough.

Now for the test. Enter **Listing 4**. This will measure the amount of time that each of the five sort algorithms takes to sort lists of varying lengths. I chose 10, 50, 100, 500, 1000, and 2000 words as being representative, although 2000 items appears to stress the limits of Applesoft BASIC. After each algorithm has sorted the list of random words, it will then add a new word to the ordered list. This latter test was quite revealing and prompted further experimentation with the insertion sort, but more on that later.

To time the tests automatically, you will need a clock card in slot 5. If you have a clock card, but it isn't in slot 5, change line 5100 to the correct slot number. If you don't have a clock card, delete lines 5100-5150 and time the sorts manually.

Purists will immediately argue that **Listing 4** is not a completely accurate test. Dimensioning the array A\$(x) to 2002 elements (line 60) places the

smaller sorts at a disadvantage. In addition, the relative position of **Listings 4B through 4F** in the program affect the efficiency, since Applesoft is an interpreted BASIC. To these classicists, I admit that these observations are correct. Actually, I had a more academic version of this test prepared, but it proved too complex to implement in a magazine article. My rebuttal to these observations is that total accuracy is not really necessary for an adequate comparison. If this still bothers you, then, to quote Yul

Listing 2. A graphic demonstration of bubble sort.

```

10  DIM A(40)
    : HOME
    : VTAB 22
    : PRINT "CREATING ARRAY"
      FOR I = 0 TO 39
        : A(I) = I
      : NEXT

20  GR
30  COLOR= 15
40  FOR I = 1 TO 39
50    PLOT I, A(I)
60    NEXT
70  HOME
    : VTAB 22
    : PRINT "SHUFFLING"
      FOR I = 0 TO 39
        : B = INT(RND(1) * 39) + 1
        : T = A(B)
        : A(B) = A(I)
        : A(I) = T
      : NEXT

80  GR
90  COLOR= 15
100 FOR I = 1 TO 39
110   PLOT I, A(I)
120   NEXT
130  N = 39
140  HOME
    : VTAB 22
    : PRINT "SORTING"
    : PRINT ""
150  GOSUB 200
160  PRINT ""
    : HOME
    : VTAB 22
    : PRINT "DONE"
    : VTAB 22
    : HTAB 20
    : PRINT "MOVES="MOVES - 1
    : END

170  REM  BUBBLE SORT
180  REM  A = ARRAY SORT
190  REM  N = ELEMENTS IN ARRAY

200  K = N - 1
210  FOR I = 1 TO K
220    L = N - I
230    FOR J = 0 TO L
240      IF A(J) <= A(J + 1)
        GOTO 340
250      T = A(J)
      : A(J) = A(J + 1)
      : A(J + 1) = T
260      COLOR= 0
270      VLIN 0, 39 AT J
280      COLOR= 15
290      PLOT J, A(J)
300      COLOR= 0
310      VLIN 0, 39 AT J + 1
320      COLOR= 15
330      PLOT J + 1, A(J + 1)
340      MOVE = MOVE + 1
350      VTAB 22
360      PRINT "MOVES="MOVE
370      NEXT
    : NEXT
380  RETURN

```

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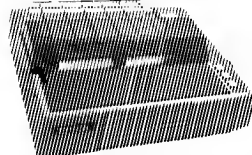
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Brynnner in *The King and I*, "You fix up."

Run **Listing 4**. You may select a test of any of the five algorithms against both ordered and unordered versions of lists of six different lengths. The results of my tests are shown in **Table 1**. The clear winner for sorting unordered data is the quicksort. The winner for sorting ordered lists is the insertion sort. The clear loser in all categories is the poor maligned bubble sort. We will discuss the results in more detail.

Bubble Sort

The bubble sort is the simplest sort to code and understand. Unfortunately, it is also the least efficient. If you have large numbers of items to sort, a classic bubble sort might take hours or even days! The prevalence of the bubble sort is the product of its simplicity—it is easy for the new programmer to understand, as witnessed by the above illustrations. The bubble sort is an exchange sort, which I have already discussed.

As I said, the bubble in bubble sort describes the way items move through the list. **Figure 2** shows the flowchart for this process. The computer compares two adjacent elements in the list and exchanges them if they are disordered (line 10070 of **Listing 4B**). If the sort is not complete, the computer selects a new pair of elements and continues (lines 10040 and 10060).

All very simple, but observe the price for programming simplicity. The benchmarks for the bubble sort in **Table 1** are atrocious. Even moderate numbers of items require inordinately long times to sort. And long lists? Forget it! The computer had to bubble for a long time (5.9 hours!) to sort 1000 items. As a lark, I decided to see how long it might take to sort 2000 items. I let my Apple churn away all night on that problem, but to no avail. The next morning, it still hadn't finished sorting. I terminated the experiment and declared the bubble sort too slow for long lists.

Insertion Sort

The insertion sort is another version of exchange sort. The insertion sort divides the list into two loops. The outer loop selects elements from the list. The inner loop finds the proper place in the list for the element selected by

the outer loop and moves the other elements to make room for the selected element. The outer loop gradually squeezes inward until all elements have been sorted. The insertion sort

differs from the bubble sort in two respects:

1) the comparisons are not between adjacent elements as they are in the bubble sort, and

Continued on p. 105.

Listing 3. Unsorted text generator.

```

10 REM -----
20 REM LISTING 5-3
30 REM GENERATE TEXT
40 REM -----

50 HOME
60 DIM A$(100)
70 D$ = CHR$(4)
80 PRINT D$"OPEN UNSORTED TEXT"
90   FOR K = 1 TO 20
100     FOR J = 1 TO 100
110       A$(J) = ""
120       FOR I = 1 TO 5
130         A = RND(1)
140         A$(J) = A$(J) + CHR$(65 + (26 * A))
150       NEXT I
160       M = M + 1
170       PRINT TAB(10);M; TAB(15);A$(J)
180     NEXT J
190   PRINT D$"APPEND UNSORTED TEXT"
200   PRINT D$"WRITE UNSORTED TEXT"
210   FOR I = 1 TO 100
220     PRINT A$(I)
230   NEXT I
240   PRINT D$"CLOSE UNSORTED TEXT"
250 NEXT K

```

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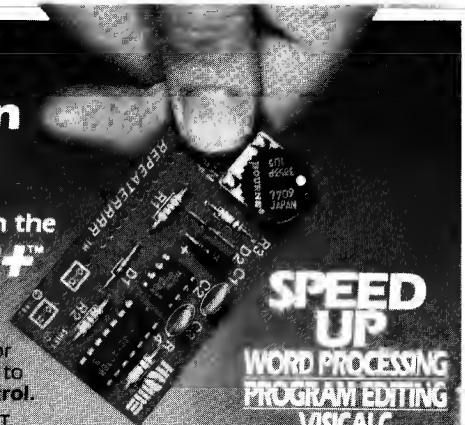
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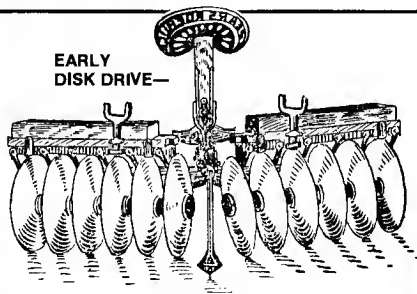
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ELSE follows Applesoft If-Then statements, like this:
IF X=2 THEN PRINT "YES"; ELSE PRINT "NO"

HSCRN reads the color of a hi-res dot for collision testing. **SWAP** exchanges variable values. **STONE** writes music without messy Pokes or Calls. **SCRL** scrolls text in either direction. **TXT2** lets Text Page 2 act exactly like Page 1...

GOTO AND GOSUB may precede variables, as in "GOSUB FIX" or "GOTO 4+X". Escape-mode indicated by a special **ESCAPE CURSOR**. Replace those awkward Graphics screen-switch pokes with one-word commands. Change your ctrl-G Beep to any tone you want. **INVERSE REM STATEMENTS** too! GPLE/Double-Take compatible.

□ **DOS BOSS™**
DOS 3.3 EDITOR by BERT KERSEY & JACK CASSIDY
 \$24.00: Includes Peeks/Pokes Chart & Tip Book #2

RENAME DOS COMMANDS and Error Messages—DOS 3.3's "Catalog" can be "Cat"; DOS's cryptic "Syntax Error" can be "Oops" or almost anything you want it to be.

PROTECT YOUR PROGRAMS. Unauthorized Save-attempts can produce "Not Copyable" message, or any message. **List-Prevention** and other useful Apple tips and tricks. Plus one-key program-execution from catalog.

CUSTOMIZE DOS. Change Disk Volume headings to your message or title. Omit or alter catalog file codes. Fascinating documentation, tips & educational experiments.

ANYONE USING YOUR DISKS (booted or not) will be forced to use DOS formatted the way YOU designed it.

□ **DOUBLE-TAKE™** (DOS 3.3 ProDOS)
 □ **DOUBLE-TAKE/PRO™**

2-WAY SCROLL/MULTI-UTILITY by MARK SIMONSEN
 \$34.95: Includes Peeks/Pokes Chart & Tips Chart #1

2-WAY SCROLLING: Listings & Catalogs scroll Up and Down, making file names and program lines easier to access. Change Catalog or List scroll-direction with Apple's Arrow keys. Machine Language and Hex/Ascii dumps scroll two-ways too. All features support 80-column display.

BETTER LIST FORMAT: Each Applesoft program statement lists on a new line for **FAST** program tracing & de-bugging. Printer-compatible in any column-width.

AS="DOGFOOD" ← **VARIABLE-DISPLAY:** prints X=3.14159 all of a program's strings and variables with their current values.
 Y=255

AS: 100 200 250 ← **CROSS-REFERENCE:** Sorts X: 10 20 3000 & displays line numbers where Y: 10 40 55 60 each variable & string appears.

AUTO-LINE-NUMBER: instant Hex/Dec Converter, better Renumber/Append, Program Stats, Eliminate/Redefine Cursor, Free Space-On-Disk... All GPLE/Pronto compatible.

!LIST

10 HGR2
 : FOR Y=0 TO 191
 : POKE 228, C
 : C=C+1/9-256*(C=255)

20 REM "Double-Take optionally lists each Applesoft program statement on a new line, making program code much easier to read."

30 HPL0T 0,Y TO 279,Y
 : NEXT Y
 : POKE 2053,58
 : GOTO 10

2-WAY VIDEO SCROLLING



High-Speed DOS

□ **PRONTO-DOS™**
HIGH-SPEED DOS/DOS-MOVER by TOM WEISHAAR
 \$29.50: Includes Peeks & Pokes Chart

TRIPLES THE SPEED of disk access and frees 10,000 bytes of extra programmable memory by moving DOS 3.3.

Function	Normal	Pronto
BLOAD HI-RES IMAGE	10 sec.	3 sec.
LOAD 60-SECTOR PROGRAM	16 sec.	4 sec.
SAVE 60-SECTOR PROGRAM	24 sec.	9 sec.

(Text-files no change) **Bload language cards** at triple speed. Create bootable high-speed disks with the normal INIT command. Compatible with all commands, GPLE, Double-Take, DOS Boss, DiskQuik & most unprotected programs.

MOVE DOS 3.3 above main memory to free 10,000 bytes of memory for your programs (64K required to move DOS). **15 EXTRA SECTORS** per disk. Catalog Free-Space is displayed on the screen every time you Catalog a disk.

NEW TYPE-COMMAND ("TYPE filename") prints the contents of any Text File on-screen or to your printer.

□ **DISKQUIK™** (Requires Ile with 128K)
DISK EMULATOR by HARRY BRUCE & GENE HITE
 \$29.50: Includes Peeks & Pokes Chart
 Requires Ile with EXTENDED 80-column card (128K)

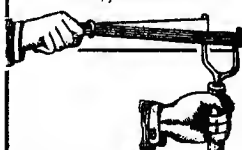
ACTS LIKE A DISK DRIVE in Slot 3, but super-fast and silent! Enjoy many of the benefits of another drive at 1/10th the cost. Catalog with "CATALOG, S3" command. Access all kind of files in RAM with normal DOS commands.

SILENT AND FAST: Since no moving parts are involved, DiskQuik operates at super-high speeds. See to believe! Your Apple Ile's Extended 80-column Card (required) holds about half the amount of data as a 5 1/4" floppy!

MANY USES: For example, load often-used files like FID into RAM when you boot up, so they are always available when you need them. Copy files from RAM onto disk and vice versa, just as if a disk drive were connected to slot #3.

COMPATIBLE with all normal DOS procedures.

1234 TEXT: HOME NORMAL:
 PRINT CHR\$(21)
 5678 R=INT(RND(1)*10): N(R)=
 N(R)+1: VTAB R+9: HTAB
 40: PRINT CHR\$(124); SPC
 (N(R)); CHR\$(R+65);
 IF PEEK(38) THEN 5678



AD#19

Multi-Utilities

□ **UTILITY CITY™**
21 PROGRAMMING UTILITIES by BERT KERSEY
 \$29.50: Includes Peeks/Pokes Chart & Tip Book #3

LIST FORMATTER prints each Applesoft program statement on a new line. For-Next Loops are indented with printer Page Breaks. A great Applesoft program de-bugger.

MULTI-COLUMN CATALOGS to your printer, with or without sector and file codes. Organize your disk library.

INVISIBLE AND TRICK catalog File Names. Put invisible functioning commands in Applesoft programs too.

21 UTILITIES TOTAL, including auto-post Run-number & Date in programs, alphabetize/store info on disk, convert dec to hex or int to FP, protect and append programs, dump 40-column text to printer. And More.

LEARN PROGRAMMING TRICKS: LIST-able programs and informative documentation. Includes Tip Book #3—Hours of good reading and Applesoft experiments.

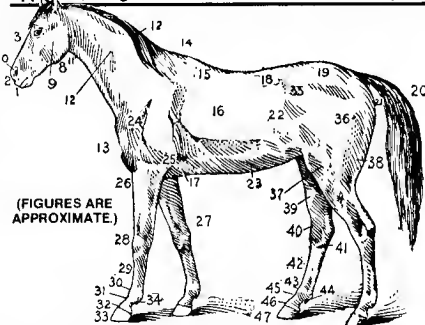


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Attention Apples: Most Apple dealers and software stores have Beagle Bros products on their shelves. If you can't find the disk you want, bug the manager—he can have any of our products in his store for you within a couple of days.

FREE APPLE COMMAND CHART: Each SILICON SALAD and TIP DISK #1 comes with an 11x17 poster of all Applesoft, Integer & DOS Commands with Descriptions.



(FIGURES ARE APPROXIMATE.)

□ **SILICON SALAD™**
WITH TIP DISK #2 by BERT KERSEY & MARK SIMONSEN
 \$24.95: With Peeks/Pokes Chart & Apple Command Chart

MANY MINI-UTILITIES: Program Splitter makes room for hi-res pix in large Applesoft programs. **Disk Scanner** finds bad disk sectors. **Key-Clicker** adds subtle sound as you type. **DOS-Killer** adds two tracks of space to your disks. **2-Track Cat** allows up to 210 DOS 3.3 file names per disk. **Text Imprinter** converts text-screen text into hi-res text. **Onerr Tell Me** prints the appropriate error message but continues program execution. **Text Screen Formatter** formats and converts text layouts into Print statements... plus much more Apple wizardry from the boys at Beagle Bros.

MORE TIPS ON DISK: Over 100 programs from Beagle Bros Tip Books 5, 6 and 7; and from Tip Chart #1.

TWO-LINERS TOO: From our customers around the world—and elsewhere. New tricks for your old Apple!

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100 TIP BOOK PROGRAMS ON DISK by BERT KERSEY
 \$20.00: With Peeks/Pokes Chart & Apple Command Chart

100 LISTABLE PROGRAMS from Beagle Tip Books 1-4. Make your Apple do things it's never done! All 100 programs are LISTable and changeable for experimentation. Two-Liners too, plus a free Apple Command Chart.

COMING JULY 84 Apple® Graphics Utilities

□ BEAGLE GRAPHICS™

DOUBLE HI-RES GRAPHICS by MARK SIMONSEN
\$59.95: Includes Peeks & Pokes Chart
Requires Apple IIc (or IIe with EXTENDED 80-col. card).

560-WIDE WITH 16 COLORS: Beagle Graphics gives you 128K-Apple (required) a full range of colors plus double high resolution—560 x 192 pixels. All Applesoft hi-res pictures, including shape tables, are supported.

NEW COMMANDS: Let you draw fast circles, ellipses and rectangles from the keyboard or from your programs.

FAST COLOR FILL: fills any outline with one of 16 solid colors or 256 color mixes (usable in your programs).

PROGRAM & PICTURE CONVERTERS: change your existing Applesoft programs and pictures to double hi-res. "Double-ize" Apple Mechanic shape table programs too!

DOUBLE-PLOT PROGRAM: lets you draw and manipulate pictures in double hi-res. Add type to pix too. Move sections of images to either page. Save pictures to disk.

HI-RES TRICKS: Amazing stuff—any portion of a picture may be rotated, flopped, moved, inverted, superimposed, scrunched or even SAVED to disk. Saving image-portions conserves disk space.

10 PRINT CHR\$(ASC("H"))
(ASC("H"))
(ASC("H"))
(ASC("H"))
(ASC("H"))
(ASC("H"))
(ASC("H"))
(ASC("H"))
(ASC("H"))
(ASC("H"))
(ASC("H"))
GOTO 10



COMING JULY 84

□ TRIPLE-DUMP™

SINGLE/DOUBLE HI-RES "PRINT-ANYTHING" UTILITY
\$39.95: Includes Peeks & Pokes Chart

PRINT ANY SCREEN IMAGE: on your dot-matrix (graphics-capable) printer—Hi-Res, Lo-Res, Double Hi-Res, Medium-Res, as well as 40 and 80-Column Text. All print functions may be used in your Applesoft programs and disks. Don't settle for a "locked up" printer-dump program.

SPECIAL EFFECTS: Crop, rotate, enlarge, distort, invert... Preview pictures on the screen before you print.

BANNER MAKER: Make impressive 8"-high signs and banners for your family, home or office. Type any message—no length limit—and let your printer do the work!

□ ALPHA PLOT™

STANDARD HI-RES GRAPHICS UTILITY
by BERT KERSEY & JACK CASSIDY
\$39.50: Includes Peeks/Pokes Chart & Tip Book #4
(Alpha Plot offers 6-color 280-pixel resolution and requires only 48K; see Beagle Graphics for 128K double hi-res.)

DRAW IN HI-RES: on both pages using easy keyboard commands. Pre-view lines before plotting. Use solid or mixed colors and Reverse (background opposite). One-key-stroke circles, boxes and ellipses, filled or not. All pictures are Save-able to disk for access by your Applesoft programs.

COMPRESS HI-RES DATA: to 1/3 disk-space, allowing 3-times the number of hi-res pictures per disk (avg. figures).

MANIPULATE IMAGES: Superimpose pictures or relocate sections of images anywhere on either hi-res page.

HI-RES TYPE: Add variable-size color & b/w text to your pictures. Type anywhere with no htab/vtab limits. Type sideways too, for Charts & Graphs. Includes Tip Book #4.

□ FLEX TYPE™

FLEXIBLE-TEXT UTILITY by MARK SIMONSEN
\$29.50: Includes Peeks & Pokes Chart

PUT VARIABLE-WIDTH TEXT: on both hi-res screens with normal Applesoft commands (including HTAB 1-70). Normal, expanded & compressed text with no extra hardware. (70-column text requires b/w monitor, not a tv).

COMBINE TEXT & GRAPHICS: Run existing Applesoft programs with Flex. GPLE/Double-Take compatible.

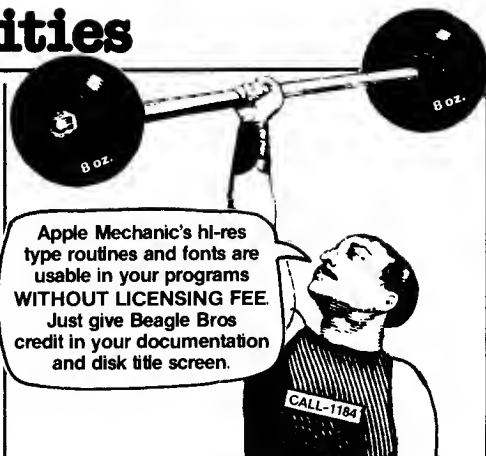
DOS TOOL KIT® font compatibility. Access up to 9 fonts in memory. Text editor lets you redesign text characters.

□ FRAME-UP™

FAST APPLE DISPLAY UTILITY by TOM WEISHAAR
\$29.50: Includes Peeks & Pokes Chart

PROFESSIONAL PRESENTATIONS: Turn existing Hi-Res, Lo-Res & Text pix into Apple "slide shows". FAST 2 1/2-sec. hi-res loading! Paddle or Keyboard-advance frames.

UNATTENDED SHOWS: optional—each picture arranged and pre-programmed to display 1 to 99 seconds. Text Screen Editor creates black & white text "slides"; lets you key-in type "live" during shows. Mail copies of presentations-on-disk to friends & associates (or home to Mom!).



□ APPLE MECHANIC™

HI-RES SHAPE EDITOR & FONTS by BERT KERSEY
\$29.50: Includes Peeks/Pokes Chart & Tip Book #5

SHAPE EDITOR: Keyboard-draw hi-res shapes for animation in your Applesoft programs. Easy "List & Learn" Applesoft demos teach how to do hi-res animation as well as professional-looking hi-res Charts and Graphs.

HI-RES FONTS: Access & create proportionally-spaced hi-res type; each character totally re-definable. Six complete fonts are included on the disk (4 large & 2 small).

MORE: Useful music, text and hi-res tricks for your Applesoft programs. Clear educational documentation and step-by-step instructions for writing graphics programs.

APPLE MECHANIC HI-RES

□ TYPEFACES™

26 FONTS FOR APPLE MECHANIC by BERT KERSEY
\$20.00: Includes Peeks & Pokes Chart

26 NEW FONTS: for use with Apple Mechanic programs. Many different sizes and typesets, both ordinary and artistic. Every character—from A to Z to "*" to "□"—of every typeface—from "Ace" to "Zooloo"—is re-definable to suit your needs. All type is proportionally spaced for a more professional appearance. People do notice the difference!

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†Available July 1, 1984

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July 1984 inCider 91

Disk Librarian

□ FATCAT™ NEW!

PERSONAL DISK LIBRARY by ALAN BIRD
\$34.95: Includes Peeks & Pokes Chart

MULTIPLE-DISK CATALOG: FATCAT reads all of your DOS 3.3 and ProDOS disks into one or more "Master Catalogs" that can be searched, sorted and printed. Get organized, and find out what's really on all of those floppies!

ALPHABETIZE FILE NAMES: FATCAT lets you sort your DOS 3.3 and ProDOS disk catalogs alphabetically, by file name, type, etc., to make files easier to find. Once arranged, a new disk directory may be written to the disk, so your files are in the order you want when you CATALOG. This feature alone is worth the price of FATCAT!



- 10 REM BEAGLE CARD FILE
- 20 HGR: HGR2: POKE 232, 120: POKE 233, 64: POKE 16504, 7: SCALE=80: P=16: X=99: FOR R=0 TO 31: P=P+1: POKE 230, 48+P
- 30 FOR Y=0 TO 1: ROT=ABS(64*Y-R): HCOLOR=3: FOR A=1 TO 25: DRAW 1 AT X+2*A, X: NEXT
- 40 HCOLOR=0: DRAW 1 AT X, X: ROT=32: DRAW 1: DRAW 1 AT X, X: NEXT Y, R
- 50 FOR A=0 TO 20: FOR B=0 TO 1: POKE 49237-B,0: X=PEEK(49200): FOR C=1 TO 6*A
- 60 NEXT C, B, A: GOTO 50

Beagle Bag!

□ BEAGLE BAG™

12 APPLE GAMES ON DISK by BERT KERSEY
\$29.50: Includes Peeks & Pokes Chart

Apple software customers recently voted BEAGLE BAG to Softalk's "Most Popular Software" list for 1983.

COMPARE BEAGLE BAG with any one-game locked-up disk on the market today. All 12 games are a blast, the price is right, the instructions are crystal clear, and the disk is COPYABLE. You can even change the programs or list them to learn programming tricks by seeing how they work.

TWELVE GAMES that last—TextTrain, Wowzo, Magic Pack, Buzzword, Slippery Digits, and many many more...

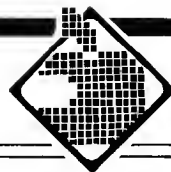
EXCELLENT REVIEWS—Read Jan-83 Softalk, pg. 148.



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Attention Dealers: Beagle Bros products rank consistently high on software best-seller charts, and captured FOUR spots on Softalk's 1983 Top-30 Most-Popular List (all categories). Telephone any Apple software distributor for fast delivery.



Hi-Res Text Typing: Part I

In the past five years I've run into the need for one particular type of utility time and time again: a hi-res text typer and labeler. I've occasionally used one kind of hi-res character generator or another for easy tasks, but I've often had needs that go beyond the capabilities of these utilities. I finally decided to take a couple of days and program just what I needed. The results are presented in this month's and next month's columns.

Programs and Files

So you can do hi-res typing and labelling in a way that matches your needs, I've created a collection of eight programs and files for you to use. They can be applied to block shape or vector shape graphics, or can label already-existing pictures. This month I'll cover the two programs for vector shape hi-res text typing and the file that they need. Next month I'll deal with the programs and files for block shape hi-res text typing.

There is one important detail you need to remember: You must do a POKE 104,64 and POKE 16384,0 before you run or load any of the enclosed programs. Your booting (HELLO) program is a good place for such POKEs. Following are descriptions of the programs and file for vector shapes.

HI-RES TEXT TYPER (**Listing 1**), being a BASIC program, is somewhat slow. However, it goes at about my typing speed, so I find it quite useful in its present form. It uses

Listing 1. HI-RES TEXT TYPER.

```

0 HGR : POKE - 16302,0: HCOLOR= 3: ROT= 0: TEXT : SCALE=
  1
1 REM HI-RES TEXT TYPER
2 ONERR GOTO 63990
3 D$ = CHR$(4): PRINT D$"BLOADALLCHAR"
4 POKE 232,0: POKE 233,16
5 TEXT : HOME
6 GOTO 250
7 IF PSN > 1103 THEN 2999
8 GOTO 310
250 CALL 62450: REM ERASE SCREEN
290 REM SET POSITION POINTER & UPPER/LOWER TOGGLE FL
  AG IN 295
295 PSN = - 1:UP = 0: DRAW 64 AT 0,0
297 TEXT : HOME : PRINT : INVERSE : HTAB 9: PRINT "HI
  -RES TEXT TYPER": NORMAL : PRINT : PRINT : PRINT
  "CTRL A = THIS COMMANDS DISPLAY (A=AID)": PRINT
298 PRINT "CTRL O = BACK TO MENU"
299 PRINT : PRINT "CTRL X = ERASE & RESTART": PRINT :
  PRINT "<-- = BACKSPACE": PRINT : PRINT "<RETRU
  RN> = CARRIAGE RETURN TO START OF NEX
  T LINE": PRINT : PRINT : PRINT : GOSUB 63000
300 REM MAIN PROG LOOP START FOR TEXT ENTRY
305 HOME : PRINT : PRINT : PRINT "NOW TYPE WI
  TH THE KEYBOARD, USING ESC ASYOUR UPPER CASE/LOWE
  R CASE TOGGLE, OR ELSE TYPE ONE OF THE CTRL CHA
  RACTER COMMANDS, SUCH AS CTRL Q TO QUIT TYPIN
  G & GO TO MENU.": PRINT
308 GOSUB 63000
309 POKE - 16304,0: POKE - 16297,0: REM DISPLAY HI-
  RES PAGE 1
310 HCOLOR= 3: GOSUB 500: GET A$:A = ASC (A$): IF A =
  27 THEN UP = NOT UP: GOTO 310: REM GET CHAR & HA
  NDLE ESC AS UPPER/LOWER TOGGLE
311 IF A = 17 THEN 2999: REM CTRL Q TO QUIT
312 IF A = 24 THEN 250: REM ERASE & RESTART
313 IF A = 1 THEN 297: REM CTRL A FOR AID MENU
320 PSN = PSN + 1: IF PSN = 1104 THEN PSN = - 1: REM
  UPDATE TEXT POSITION
325 IF A = 13 THEN CH = 96: HCOLOR= 0:Y% = 8 * INT (
  PSN / 46):X% = 6 * (PSN - INT (PSN / 46) * 46): DRAW
  CH AT X%,Y%:PSN = INT ((PSN + 1) / 46) * 46 + 45
  : GOTO 7: REM HANDLE CARRIAGE RETURN
327 IF A = 8 THEN CH = 1:PSN = PSN - (PSN > - 1):Y% =
  8 * INT (PSN / 46):X% = 6 * (PSN - INT (PSN / 4
  6) * 46): HCOLOR= 0:CH = 96: DRAW CH AT X%,Y%: GOSUB
  500: HCOLOR= 3:PSN = PSN - (PSN > - 1): GOTO 310
  : REM BACKSPACE
330 CH = A - 31: IF CH < 0 THEN CH = 1: REM TABLE #
  S START AT ASC 32 (SPACE BAR); < 33 WILL BE SEEN
  AS SPACE
340 IF A > = 65 AND A < = 90 AND UP = 0 THEN CH = C
  H + 32: REM LOWER CASE IF UPPER CASE FLAG=0
  
```

Listing continued.

Address your correspondence to Don Fudge c/o Avant-Garde Creations, P.O. Box 30160, Eugene, OR 97403.

by Don Fudge

Listing continued.

```

345 Y% = 8 * INT (PSN / 46):X% = 6 * (PSN - INT (PSN
/ 46) * 46): XDRAW 64 AT X%,Y%: REM ERASE OLD CU
RSOR
350 Y% = 8 * INT (PSN / 46):X% = 6 * (PSN - INT (PSN
/ 46) * 46): DRAW CH AT X%,Y%: GOTO 310: REM DRA
W TYPED CHAR
500 Y% = 8 * INT ((PSN + 1) / 46):X% = 6 * ((PSN + 1)
- INT ((PSN + 1) / 46) * 46): DRAW 64 AT X%,Y%:
RETURN : REM CURSOR ROUTINE
2999 TEXT : HOME : PRINT
3000 PRINT "(1) SAVE THE CURRENT SCREEN": PRINT : PRINT
"(2) LOAD A SAVED SCREEN": PRINT : PRINT "(3) ERA
SE SCREEN; RETURN TO TYPE MODE": PRINT : PRINT "(
4) DON'T ERASE; RETURN TO TYPE MODE"
3001 : INVERSE : PRINT : PRINT "RETURN";: NORMAL : PRINT
" CATALOG DISK ": PRINT
3010 PRINT "(1-4): ";: GET A$
3015 PRINT CHR$(13): CALL 1002
3018 IF ASC (A$) = 13 THEN PRINT D$"CATALOG": GOSUB
63000: GOTO 2999
3019 IF ASC (A$) < 49 OR ASC (A$) > 52 THEN 2999
3020 ON VAL (A$) GOTO 4000,5000,250,3100
3100 POKE - 16304,0: POKE - 16297,0: GOTO 310
4000 TEXT : HOME : INPUT "SCREEN NAME: ";SC$: IF LEN
(SC$) = 0 THEN 2999
4002 HCOLOR= 0: GOSUB 500
4005 GOSUB 20000
4010 PRINT D$"BSAVE"SC$",A$2000,L$1FF8": GOSUB 21000:
GOTO 2
5000 TEXT : HOME : INPUT "SCREEN NAME: ";SC$: IF LEN
(SC$) = 0 THEN 2999
5005 GOSUB 20000
5010 PRINT D$"BLOAD"SC$",A$2000"
5015 GOSUB 21000
5035 POKE - 16304,0: POKE - 16297,0: GOSUB 63000
5040 GOTO 2999
20000 TEXT : HOME : FLASH : PRINT : PRINT "SWITCH TO
YOUR DATA DISK.": NORMAL : GOSUB 63000: RETURN
21000 TEXT : HOME : FLASH : VTAB 4: PRINT "SWITCH TO
YOUR PROGRAM DISK.": NORMAL : GOSUB 63000: RETURN
63000 PRINT : PRINT "(HIT SPACE BAR TO CONTINUE)": NORMAL
63010 PK = PEEK ( - 16384): IF PK > 127 THEN POKE -
16368,0: RETURN
63020 GOTO 63010
63990 ER = PEEK (222): POKE 216,0
63991 ONERR GOTO 63990
63995 IF ER = 254 THEN RESUME
63999 GOTO 2999

```

Listing 2. HI-RES STRING LABELLER.

```

0 HGR : POKE - 16302,0: HCOLOR= 3: ROT= 0: TEXT : SCALE=
1
1 REM HI-RES STRING LABELLER
2 ONERR GOTO 63990
3 D$ = CHR$(4): PRINT D$"BLOADALLCHAR"
4 POKE 232,0: POKE 233,16
5 TEXT : HOME
6 PRINT : PRINT "ESC IS UPPER/LOWER TOGGLE; RETURN IS
FOREND OF STRING.": GOSUB 63000
7 PRINT : PRINT "IF YOU USE PADDLES TO LOCATE STRINGS
, THEN PLEASE USE BUTTON #0 TO PRINT THEM.": GOSUB
63000
250 INPUT "PIC. NAME: ";A$: PRINT D$"BLOAD"A$
255 A$ = "":UP = 0
258 TEXT : HOME : NORMAL : PRINT "STRING: ";
260 GET C$: IF ASC (C$) = 27 THEN UP = NOT UP

```

Listing continued.

control-X to erase, control-Q to quit, and control-A for help. Because it uses vector shapes, it's possible to modify HI-RES TEXT TYPER so the typing appears sideways or upside down (via the ROT command). Bold can be created by DRAWing a character twice, the second time at X+1 (an incremented horizontal coordinate). However, all 46's in the program would have to be changed to 40's if bold were used, since the 46's apply to 6-by-8 character spaces (24 lines of 46 characters each, a 15 percent improvement over normal Apple text pages).

Whereas block shape text characters (in next month's column) need to be placed 7 dots apart in hi-res byte columns, vector shape characters (in ALLCHAR, see below) have no such limitation. Therefore 6 dots apart worked out just fine.

HI-RES STRING LABELLER (**Listing 2**) labels pictures and diagrams you already have. You can type in the starting coordinates of the label, or locate the label with your game paddles. Also, any programmer with a few solid months of experience should be able to take the string-printing algorithm in this program and incorporate it in his or her own applications.

ALLCHAR (**Listing 3**) is a file of 96 characters, in the form of vector shapes, to be used with HI-RES STRING LABELLER and HI-RES TEXT TYPER. The file is 1272 bytes long and starts at 4096. The shape numbers correspond to the ASCII code for a character minus 31. For instance, a space is shape one, since its ASCII code is 32. Lowercase letters have shape numbers 32 higher than uppercase letters. If you have an Apple II Plus you might have to alter the programs a bit to get them to print characters for which the keyboard has no dedicated keys.

I'll discuss the details of using HI-RES TEXT TYPER first, and later consider the HI-RES STRING LABELLER program. Remember, both programs use the ALLCHAR vector shape table.

Using HI-RES TEXT TYPER

When you use this utility, it makes a difference whether you have an Apple II Plus or an Apple //e. With a

Listing continued.

```

261 IF ASC (C$) = 8 THEN L = LEN (A$):A$ = LEFT$ (
    A$,L - 1): HTAB PEEK (36): PRINT " ";: POKE 36, PEEK
    (36) - 1: GOTO 260
262 IF ASC (C$) = 13 THEN PRINT CHR$ (13): NORMAL
    : GOTO 267
263 INVERSE : IF UP = 0 THEN NORMAL
264 PRINT C$;
265 A$ = A$ + C$
266 GOTO 260
267 PRINT "DO YOU WANT TO USE PADDLES FOR LOCATING ST
    RINGS? (Y/N): ";: GET L$: PRINT L$: PRINT CHR$ (
    13): IF ASC (L$) < > 89 AND ASC (L$) < > 78 THEN
    HOME : GOTO 267
268 IF ASC (L$) = 78 THEN PRINT : INPUT "X COORD: "
    ;X$: INPUT "Y COORD: ";Y%
270 POKE - 16304,0: POKE - 16297,0:L = LEN (A$):UP
    = 0
272 IF ASC (L$) = 89 THEN GOSUB 300
275 FOR B = 1 TO L:M$ = MID$ (A$,B,1):A = ASC (M$) -
    31
280 IF A < 1 THEN UP = NOT UP: GOTO 290
282 IF UP = 0 AND A > 33 AND A < 60 THEN A = A + 32
285 DRAW A AT X%,Y%:X% = X% + 6: IF X% > 275 THEN X% =
    0:Y% = Y% + 8
290 NEXT : GOSUB 63000: TEXT : HOME : GOTO 255
300 P0 = PDL (0):P1 = .722 * PDL (1): XDRAW 96 AT P0
    ,P1: FOR QW = 1 TO 50: NEXT : XDRAW 96 AT P0,P1: IF
    PEEK (- 16287) > 127 THEN X% = P0:Y% = P1: RETURN

310 GOTO 300
63000 PRINT : PRINT "(HIT SPACE BAR TO CONTINUE):": NORM

63010 PK = PEEK (- 16384): IF PK > 127 THEN POKE -
    16368,0: RETURN
63020 GOTO 63010
63990 ER = PEEK (222): POKE 216,0
63991 ONERR GOTO 63990
63995 IF ER = 254 THEN RESUME
63999 GOTO 0

```

//e the caps lock key controls upper- and lowercase, which means that if you forget to use it you'll stay in the case you're presently using. If you like using escape for the upper/lowercase toggle (switch), then make sure the caps lock key is down when you're typing. If you have an Apple II Plus with no fancy upper/lowercase chip, you'll have to use escape to toggle upper- and lowercase on and off.

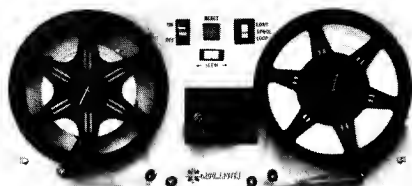
Upon entering HI-RES TEXT TYPED, you'll first see the display of commands. Notice that control-A will summon "aid" (which means the display you're now looking at), while control-Q will enable you to quit typing and return to the program menu.

Try it. Hit space to get past the commands display, read the reminder about upper/lowercase toggling, and hit space again. Then begin typing, using escape or shift for upper/lower toggling, depending on your machine. Notice that the characters are slightly closer together than with normal text. Then notice that backspacing erases old typing, even if you get to a left margin and jump up a line in the process. Finally, notice that I use the underline symbol as a cursor. To change that, substitute the 64 in lines 345 and 500 with 96, or whatever else you

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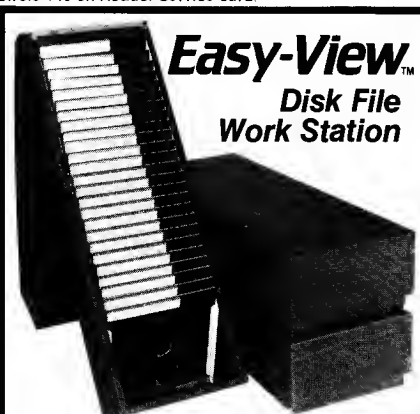
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desire, remembering that shape number equals ASCII minus 31.

Saving Screens

Whenever you're typing along in HI-RES TEXT TYPER and run out of room at the bottom right corner of the screen, the program will automatically send you to the program menu (the **Figure**) since the screen is FULL. Or, if you decide to quit typing and hit control-Q you'll also return to the menu.

With menu option one you can

save your screen. With option two you can load in any 33-34 sector hi-res screen, even if it was saved from hi-res page 2 instead of hi-res page 1, which is the page used by HI-RES TEXT TYPER. Option three enables you to erase and restart your "page" of typing, while with option four you can continue typing from where you left off.

The most obvious use for HI-RES TEXT TYPER is in creating screens of text to save as hi-res pictures for use in your own programs. The com-

mands you must incorporate in your program to do this appear in **Listing 4**.

Separate these commands with colons, use an appropriate line number, and substitute your picture file's name for "filename." Also, so your picture will stay on screen until the user hits any key to continue, you'll need to follow the commands in Listing 4 with GETQ\$:PRINT CHR\$(13). This provides the needed "stop until keypress." The GET Q\$ waits for a keypress, while the CHR\$(13) is a

Listing 3. ALLCHAR.

```

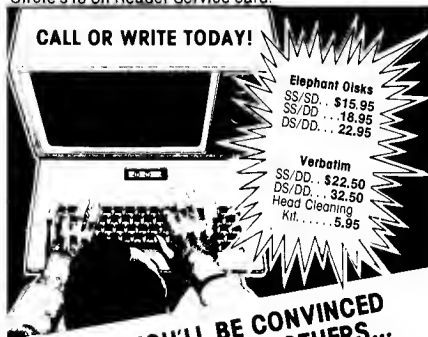
1000- 7E 00 FE 00 00 01 06 01
1008- 0C 01 1D 01 2B 01 37 01
1010- 44 01 48 01 50 01 58 01
1018- 66 01 6E 01 75 01 7A 01
1020- 7F 01 87 01 96 01 9E 01
1028- A9 01 B4 01 C1 01 CE 01
1030- DB 01 E4 01 F2 01 00 02
1038- 05 02 0C 02 15 02 1D 02
1040- 26 02 2F 02 3D 02 4C 02
1048- 5A 02 66 02 72 02 7F 02
1050- 8A 02 96 02 A2 02 AB 02
1058- B4 02 C1 02 C8 02 D5 02
1060- E3 02 EF 02 FB 02 08 03
1068- 17 03 24 03 2C 03 36 03
1070- 40 03 4C 03 58 03 64 03
1078- 6F 03 7C 03 83 03 90 03
1080- 98 03 9F 03 A4 03 AF 03
1088- BA 03 C4 03 D1 03 DC 03
1090- E5 03 F2 03 FD 03 05 04
1098- 0D 04 17 04 1F 04 2A 04
10A0- 36 04 40 04 4C 04 59 04
10A8- 64 04 70 04 77 04 7F 04
10B0- 88 04 92 04 9D 04 A9 04
10B8- B4 04 BF 04 C8 04 D2 04
10C0- D9 04 2D 25 2D 25 2D 2D
10C8- 14 65 2B 27 FD 0E 22 E7
10D0- 24 1E ED 1E 2A 75 12 1C
10D8- 6D 0E 6B 0E 6B E6 12 E7
10E0- 24 3F 22 66 6B 65 45 1C
10E8- 24 1E 2A 0C 12 2E 12 0E
10F0- 14 E7 24 1E 24 1E 24 1E
10F8- 6A 1C 07 75 0A 00 01 00
1100- 49 36 36 16 06 00 09 36
1108- 0D 24 04 00 09 36 36 36
1110- 0D 24 24 24 8D 13 16 1F
1118- 04 F8 16 06 00 49 2E B5
1120- F2 37 1C 67 61 3F 1C 0C
1128- 0E 05 00 31 25 4D F2 1E
1130- 1E 1E 4E 29 3C 07 00 09
1138- 0E F6 0E 0D 1E 0E 1F E7
1140- 24 20 04 00 49 36 06 00
1148- 49 1E 1E 36 0E 0E 05 00
1150- 49 0E 0E 36 1E 1E 1E 00
1158- 49 36 36 36 0D E0 04 60
1160- DF 73 16 1E 1E 00 49 32
1168- 36 2E 40 FF 3F 00 49 92
1170- 12 F6 06 00 2D 91 2A 2D
1178- 2D 00 49 92 92 06 00 91
1180- 92 0C 0C 0C 0C 05 00 09
1188- 2D 0E 36 36 1E 3F 1C 24
1190- 24 4E F1 1E 06 00 49 1E
1198- 35 36 76 3F 07 00 11 0C
11A0- 2D 0E F6 F7 1E 2E 2D 2D

11A8- 00 29 2D 35 1E 1E 75 F6
11B0- 3F 1C 04 00 49 31 36 0E
11B8- 37 3E 80 80 3F 64 0C 04
11C0- 00 29 2D B5 3B 3F B4 49
11C8- 31 F6 3F 1C 04 00 49 09
11D0- 3F 1E 1E 36 76 2D 0C E4
11D8- 3F 07 00 29 2D 35 1E 1E
11E0- 1E 36 06 00 09 2D 0E F6
11E8- 3F 1E 76 2D 0C 24 D8 1B
11F0- 24 00 09 2D 0E 36 F6 1E
11F8- 3F 04 40 2D DC 23 04 00
1200- 49 12 16 06 00 49 92 16
1208- F6 06 00 49 49 F1 1E 1E
1210- 0E 0E 0E 05 00 91 2D 2D
1218- 16 3F 3F 07 00 09 0E 0E
1220- 0E 1E 1E 1E 07 00 11 0C
1228- 2D 0E 1E 1E B6 06 00 09
1230- 2D 0E 36 96 3F E7 24 24
1238- 8D 36 25 04 00 91 36 36
1240- 4D 21 3C 3F 04 80 80 0C
1248- 0E 0E 36 00 29 2D 0E F6
1250- 3F 04 18 36 36 2E 2D 0C
1258- 24 00 49 89 1C 3F 1E 36
1260- 36 0E 2D 0C 04 00 29 2D
1268- 0E 36 36 1E 3F 27 24 24
1270- 04 00 29 2D B5 1A 3F 04
1278- 18 36 36 2E 2D 2D 00 29
1280- 2D B5 1A 3F 04 18 36 36
1288- 36 00 09 2D F5 DB 36 36
1290- 0E 2D 25 3C 07 00 31 36
1298- 36 6E 09 24 3C 3F 4C 21
12A0- 24 00 09 2D 1E 36 36 0E
12A8- 3F 07 00 49 36 36 F6
12B0- 3F 1C 04 00 31 36 36 6E
12B8- 09 1C 1C 1C 0C 0C 0C 0C
12C0- 00 31 36 36 2E 2D 2D 00
12C8- 31 36 36 6E 09 24 24 24
12D0- 1E 1E 1C 04 00 31 36 36
12D8- 6E 09 24 24 24 9F 13 0E
12E0- 0E 06 00 09 2D 0E 36 36
12E8- 1E 3F 1C 24 24 04 00 31
12F0- 36 36 2E 80 80 28 65 E4
12F8- 3F 04 00 09 2D 0E 36 FE
1300- 0E 0E 1F E7 24 24 04 00
1308- 29 2D 0E F6 3F 04 18 36
1310- 36 6E 09 1C 1C 05 00 09
1318- 2D 0E DF 33 0E 2D 0E F6
1320- 3F 1C 04 00 29 2D F5 33
1328- 36 36 06 00 31 36 36 0E
1330- 2D 0C 24 24 24 00 31 36
1338- 76 0E 0C 0C 24 24 04 00
1340- 31 36 36 66 0C AC 72 24
1348- 24 24 04 00 31 0E 16 1E

1350- 6E 09 E4 1C 0C 0C 24 00
1358- 31 0E 0E 36 2E 80 80 80
1360- 80 0C 24 00 29 2D 35 1E
1368- 1E 1E 1E 2E 2D 2D 00 31
1370- 36 36 2E 2D E5 1B 24 24
1378- 2C 2D 05 00 11 0E 0E 0E
1380- 0E 05 00 29 2D 35 36 36
1388- 3E 3F 67 09 24 24 07 00
1390- 91 12 0C 0C 0E 0E 05 00
1398- 91 92 12 2D 2D 05 00 09
13A0- 0E 0E 06 00 91 29 35 36
13A8- 2E DE 38 1C 0C 2D 00 31
13B0- 36 36 2E 70 65 24 1C F7
13B8- 06 00 91 49 39 3F 1E 36
13C0- 0E 2D 2D 00 49 09 36 36
13C8- 36 1C 1E E7 24 0C 75 06
13D0- 00 91 29 75 3E 3F 1C 36
13D8- 0E 2D 05 00 49 75 DF F6
13E0- 2D 1E 36 06 00 91 29 0D
13E8- 1E F5 35 F6 3F 04 08 E7
13F0- 24 00 31 36 36 2E 80 80
13F8- 60 75 36 36 00 49 16 77
1400- 36 1E 2D 05 00 49 16 77
1408- 36 F6 1C 04 00 31 36 36
1410- 6E E1 1C 0C 0C 04 00 09
1418- 35 36 36 1E 2D 05 00 91
1420- 36 36 0D 24 E4 0D 0E 36
1428- 36 00 91 36 36 0D 18 80
1430- 80 0C 75 36 36 00 91 29
1438- 75 36 1E 3F 1C 24 04 00
1440- 91 36 36 2E 80 80 2D 0C
1448- E4 3F 07 00 91 29 35 36
1450- 36 F5 03 80 80 38 1C 24
1458- 00 91 36 36 0D 18 80 80
1460- 0C 75 06 00 49 89 3A 3F
1468- 1E 0E 2D 0E 1E 3F 3F 00
1470- 49 F6 2D 1E 36 36 00 91
1478- 36 76 2D 0C 24 24 00 91
1480- 36 0E 0E 0C 0C 24 04 00
1488- 91 36 76 0C 24 95 62 24
1490- 24 00 91 0E 16 1E 4D E1
1498- 1C 0C 0C 0C 00 91 36 0E
14A0- 2D 25 24 95 D2 1E 3F 07
14A8- 00 91 2D 2D 1E 1E 1E 1E
14B0- 2D 2D 05 00 49 2D DE 73
14B8- 1E 77 F1 0E 2D 05 00 09
14C0- 0E 0E 0E 1E 1E 1E 1E 00
14C8- 29 75 1E 0E F5 73 1E 3F
14D0- 07 00 11 0C 0E 0E 0C 05
14D8- 00 29 2D 2D 35 3F 3F 3F
14E0- 2E 2D 2D 35 3F 3F 3F 2E
14E8- 2D 2D 35 3F 3F 3F 2E 2D
14F0- 2D 35 3F 3F 3F 07 00 00

```

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Figure. HI-RES TEXT TYPER menu.

1. SAVE THE CURRENT SCREEN
 2. LOAD A SAVED SCREEN
 3. ERASE SCREEN; RETURN TO TYPE MODE
 4. DON'T ERASE; RETURN TO TYPE MODE
- RETURN: CATALOG DISK
 (1-4)

RETURN, something the INPUT command uses but the GET command does not. (See pages 53-54 of your *DOS Manual*.) The CHR\$(13) prevents interference with future DOS commands.

Another way to use HI-RES TEXT TYPER (after you make some changes mentioned below) is to load in a picture (a colorful scene or diagram, etc.) using option two, and then type only at chosen places on the screen, using space or (carriage) return whenever needed. The cursor that makes temporary marks on your picture will disappear without damage to your picture if you hit either space or return, so you should be able to affect *only* the chosen sections of the picture. Changes to HI-RES TEXT TYPER you'll need to prevent the cursor "tracks" appear in **Listing 5**. If you don't mind your cursor leaving footprints, then leave the program as it is.

Another consideration is the choice of DRAW or XDRAW format for creating a picture. If DRAW is in operation (the way the program is now), then you'll find that when a character is placed on top of an occupied area of the screen, the white bits go on the screen regardless of anything else that's there, and if a lot of white already exists at that point your character will be invisible. However, if the altered program (after the Listing 5 changes) places a character on a mostly-white area, it

will appear in black and be visible, because the altered program XDRAWs. I suggest saving each version and using the one that meets your current needs whenever you need to use one of these programs.

As I mentioned, HI-RES TEXT TYPER operates at about the same speed as I type, so I don't really need it to be faster. But good typists will out-distance the program quite readily, so I recommend next month's machine language hi-res block shape typing program for them. It's called MACH LANG TYPER DRIVER.

Using HI-RES STRING LABELLER

This program enables you to place a label in any area of the hi-res screen. As with HI-RES TEXT TYPER, you'll need escape as your upper/lowercase toggle unless you have an Apple IIe, in which case you'll use the shift key.

To get the program running, remember to make sure that POKE 104,64 and POKE 16384,0 have

Listing 4. The sequence of commands, to include in other BASIC programs, for calling up screens created by HI-RES TEXT TYPER.

```
PRINT CHR$(4) "BLOAD filename"
POKE - 16304,0
POKE - 16297,0
POKE - 16302,0:REM NEEDED
ONLY ONCE IN MOST
PROGRAMS
```

Listing 5. Changes to HI-RES TEXT TYPER that will prevent cursor "tracks."

- 1) Line 295, eliminate DRAW 64 AT 0,0.
- 2) Line 310, add GOSUB 500 just before GOTO 310.
- 3) Line 325, change CH = 96 to CH = 64 and change DRAW to XDRAW.
- 4) Line 327, add GOSUB 500 before Y% = 8* (etc.) and eliminate GOSUB 500:HCOLOR = 3.
- 5) Line 350, change DRAW to XDRAW.
- 6) Line 500, change DRAW to XDRAW.

happened in the HELLO program or in immediate mode. Then enter RUN HI-RES STRING LABELLER. It's okay to do a control-reset while in HI-RES TEXT TYPER and then run HI-RES STRING LABELLER. (Reset won't hurt anything unless your disk drive is running.)

If you intend to use paddles to locate labels, make sure they're plugged in. Joysticks will work too. If you want to use the program without loading in a picture first (perhaps to get familiar with it), you'll need to do one of two things:

- 1) Temporarily substitute 250 CALL 62450 for the present line 250, or
- 2) HGR
control-reset
BSAVE PIC,A\$2000,L\$1FF8

The latter creates a blank picture, while temporarily changing line 250 eliminates the need for any picture. Once you've got the program running, either you'll specify PIC as the "PIC.NAME" when prompted, or you'll not even be asked about a picture and move on to string inputting. Strings may be up to six lines long, but remember that we're using 46 characters per line, not 40.

Notice that if you're inputting uppercase characters, the screen shows *inverse* (unless you're using shift with a //e), while lowercase characters appear normal.

If you're typing in screen coordinates, use an X (horizontal) coordinate of 0-273 and a Y (vertical) coordinate of 0-184.

Once you're through labelling, simply hit control-reset and save your picture in the normal way with:
BSAVE picname, A\$2000,L\$1FF8

You could adjust the program so that hitting return for "PIC.NAME" in line 250 would result in going to the next line without loading a picture. Try this:

Listing 6. Changes to HI-RES STRING LABELLER for saving a picture right in a program.

- 1) Change line 262 to 262 IF ASC (C\$) = 13 AND A\$ < > " " THEN PRINT CHR\$(13); NORMAL: GOTO 267.
- 2) Change line 264 to 264 PRINT C\$; IF ASC (C\$) = 13 AND A\$ = " " THEN 4000.
- 3) At line 4000 insert lines 4000-4010 from HI-RES TEXT TYPER.

**"A good
challenge for
you might be to
create a
program that
labels in all four
directions."**

250 CALL 62450: INPUT "PIC.NAME:";
A\$: IF LEN(A\$) > 0 THEN PRINT D\$
"BLOAD" A\$

Another trick would be to make hitting return alone as a string (word or string of characters) result in going to line 4000 where you could save the picture right in the program. The necessary changes to HI-RES STRING LABELLER appear in **Listing 6.**

A good challenge for you might be to create a program, based on HI-RES STRING LABELLER, that labels in all four directions: readable from the left, the right, the bottom, or the top.

Using the TASC compiler, I made HI-RES TEXT TYPER and HI-RES STRING LABELLER operate faster. However, the compiled program was less reliable, and bombed occasionally, so I don't recommend this wholeheartedly.

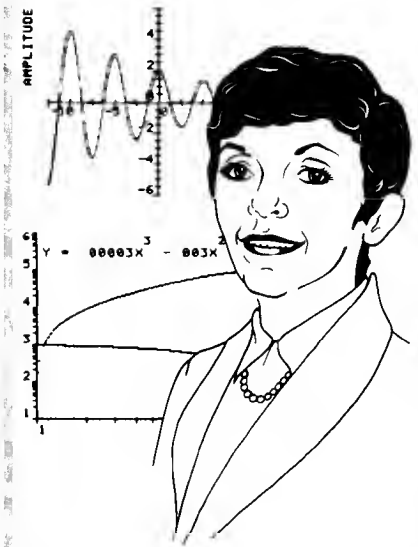
Next time I'll present part two of this hi-res text typing project. It will include very speedy block shape text typing, a block shape character table, and more.

See you then! ■

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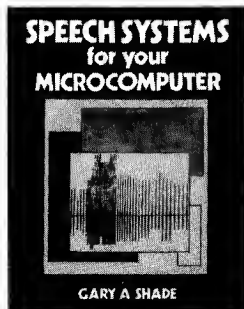


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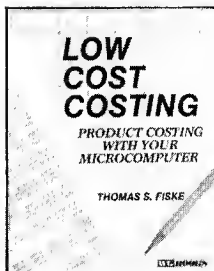
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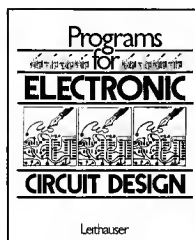


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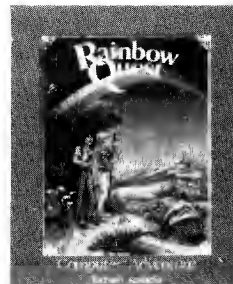
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A S K I N C I D E R

If you have a general question you want answered or if you would like to comment on some of the opinions expressed here, write me c/o inCider, 80 Pine Street, Peterborough, NH 03458.

Dear inCider:

I am seriously considering both PFS:File and PFS:Write for my system, which is an Apple II Plus. I have 64K in my system, and I plan to buy an 80 column card. Everyone talks about the fact that these programs run on the //e. Will they run on my machine? Do you have experience with PFS:File? Has it been reviewed in inCider? Any thoughts on another word processor to run on my system?

From time to time, inCider carries ads for Instant Software. I have tried to get the catalog that they offer but I can't get any response. Can you help me out?

**Stephen Brandt
4384 Bel Air Drive
La Canada, CA 91011**

Dear Steve:

Software Publishing is still selling a version of PFS:File that runs on the II Plus. My experience with PFS:File has been very good. It is easy to use and I think that the documentation is super. It is one of the best filing programs on the market. *inCider* has not reviewed PFS:File because the program was already a couple of years old when we started publishing. This month, however, we kick off a comparative review column written by Greg Glau that gives us the flexibility to compare both new and old programs. Coincidentally (really!), PFS:File is one of the programs under scrutiny in this month's *inCider*.

PFS:Write will only run on the //e and Software Publishing hasn't de-

cided if it will be offered for the II Plus. As far as other full-featured word processors are concerned, you may want to consider programs such as Applewriter, Format II, Magic Window II, Pie Writer, Screenwriter II, SuperText, or Zardax. (Check out the word processing buyer's guide we ran last December.) If you're looking specifically for a word processor that can swap data with PFS:File, then Applewriter will be your choice. A company called Micro Fun publishes a program that will let you access information in PFS programs with Applewriter.

Finally, Instant Software has had a change of name. It's now called I/O Ware. You can contact them at I/O Ware, Inc., Route 202N, Peterborough, NH 03458.

Dear inCider:

I have typed in most of Don Fudge's programs and I was wondering what would happen if I ran one of his programs without the POKES he says to put into the HELLO program. I discovered that, without the POKES, I got a lot of trash on the screen. How can I remedy this problem without affecting the other programs on my disk?

**John Kuwaye
2339 Birch Log Way
Hacienda Hts., CA 91745**

Dear John:

The POKES that you refer to are used by Don to indicate where the Applesoft program loads into memory. He relocates the program to keep it from running over into the hires screens. In order to use most of Don's programs, you have to have these POKES in your HELLO program and run the HELLO program before you run Don's. Unless you have some huge programs on the same disk as Don's, your other programs should behave normally. For a

more thorough explanation, see last month's "Fudge It!"

Dear inCider:

When I got my Apple //e computer I was sure that it was a very complete and capable machine. I do, however, have one major complaint—the program editing capability. Previous to owning the Apple, I had a TI-99/4A, and even it had editing functions with insert and delete. Is there anything that I can do to get edit capabilities on my Apple, such as a program or a board to insert into my computer?

**Andrew M. Dressel
101 Twin Drive
Caseyville, IL 62232**

Dear Andrew:

You're not the first programmer to bemoan the paltry editing functions contained in Applesoft. In fact, so many people have complained that a number of companies have produced editing programs for the Apple. The most widely used editor is probably GPLE (Global Program Line Editor) by Synergistic Software. It takes up about 4K at the top of memory but most people think that it's worth it. Other popular editors include A.C.E. from Southwestern Data Systems, and GALE from Microsparc. They all do a good job in correcting the deficiencies of the Applesoft editing functions.

Dear inCider:

Recently, I received an Apple Language Card as a gift. I found that I can now use Integer BASIC. I went down to the computer store and asked about it. I was told that it was a "dead" language. Is this true? If it isn't, could you tell me of any books or guides to Integer BASIC?

Jeff Bruno

by Bob Ryan

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A S K I N C I D E R

Dear Jeff:

You could say that no language is dead if there are some people still speaking it, but Integer BASIC comes awfully close. When I got your letter, I checked with Apple to see if they still sold a manual for it. They don't. I then checked through the collection of books that we keep around the office. All but a few deal exclusively with Applesoft. *Basic Apple BASIC* by James Coan contains a discussion of Integer BASIC, and the *Applesoft BASIC Reference Manual* from Apple lists the differences between Applesoft and Integer on pages 142 and 143. If any readers know of any other Integer BASIC references, let us know.

Dear *inCider*:

I am thinking of buying an Apple IIe to do complete numerology charts. Would you know of anyone that has a program on numerology?

Nadea K. Collins
2404 E. Hill Road
Grand Blanc, MI 48439

Dear Nadea:

After plowing through all the software directories that are floating around the office, I finally came up with a single numerology program. It is called "Luck Day Numerology Report." It is "a complete disk-based report writer based on a numerological analysis of a customer's name and birthdate." (I'm quoting the Blue Book.) It is produced by Matrix Software, 315 Marion, Big Rapids, MI 49307. Sorry, Nadea, but that's all I could find. Readers, how about some help?

Dear *inCider*:

I appreciate the programs by Mr. Dan Bishop [The Applesoft Adviser] but I have two questions about his "Hi-Res Alphabet Soup" (March '84 *inCider*).

1. On the DATA statement listings (page 15), the number of spaces after the DATA keyword varies from two to six. When I type this I always get only two spaces. Why does this happen? Can it affect my program?

2. I do not understand the word

"CARROT" in line 1610, because I get the exponent sign when I run the program. Please explain.

Are you folks no longer going to carry short programs, like you did when you first started? It is a lot more fun to be able to type in short programs and have them work right away—or if a complex program, it is easier to have them in shorter modules.

Chip Uhn
227 S. Western Avenue
Apt. #15
Los Angeles, CA 90004

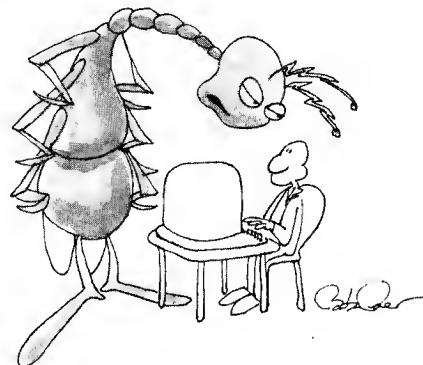
Dear Chip:

I have absolutely no idea why the spacing in the DATA statements came out so strangely. I do know, however, that the spacing has no effect on the program. Apple users are lucky that Applesoft is so forgiving about spaces. Other microcomputer owners "don't have it so good."

The "CARROT" that has you so puzzled is a misspelling. It should actually be "CARET." It's the proof-reading symbol you use when you want to insert something in a line. In Applesoft, of course, it is also the symbol for exponentiation.

We most certainly are going to continue to carry short programs in *inCider*. We like them as much as you do. In fact, it is the long programs that you will be seeing less of in the magazine. So if you have any neat little programs that you want to share, send them in!

P.S. Speaking of short programs, don't be surprised if *inCider* announces a contest on that subject in our next issue. ■



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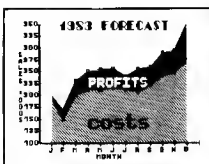
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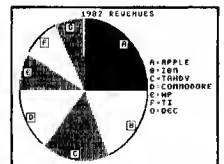
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Easy on the Fingers... Joyshtick... Aces Again...

Our dear old Apple II (pre-revision 6, purchased used in 1980) is beginning to show its age. Among the most mysterious of its ailments is turning on disk drive 1 at random moments. Usually, a scrubbing of the silver contacts on the controller board cures this problem. To do this scrubbing, I just use an eraser and rub vigorously.

Lately, my scrubbing technique does not always work. I'll be working away at the keyboard and for no apparent reason the disk drive will start to whirl, the red light will go on, but I don't hear the head doing any moving (reading or writing). The activity doesn't interfere with anything. A PR#6 instruction will usually cause the mystery to go away after performing a boot.

The problem seems to be confined to disk drive #1. My new Forth Dimension disk drive in drive #2 doesn't do this—just the Apple in drive #1. The problem is more common when the system is warm.

Head cleaning doesn't help. Any suggestions? Thanks in advance for your help.

**D. Nasatir
Carson, CA**

Your letter reminds me how careful one has to be when giving advice. In many places, including this column, I have seen the

procedure described for cleaning the "edge fingers" on a peripheral card. The eraser technique must be used sparingly. Try using alcohol and a lint-free cloth to clean the edge fingers. If you must use the eraser technique, go easy.

Well, off the soap box and on to your problem. The disk drive motor (the rotational one) is enabled by the disk controller card. Since you observed no read or write head motion, changing the controller card may clear up the problem. If you had observed read or write head movement the possibilities would broaden. I have seen motherboards go wild and access the disk drive without being asked to. Usually when this happens the read or write head moves as well as the rotational drive motor. You may wish to try the controller in another slot for a while to verify that the problem is not in the slot 6 position of the motherboard.

I own an Apple IIe and am trying to teach myself graphics. I want to be able to display high resolution graphics with at least four lines of text at the bottom of the screen. All the books that I have read have stated that it is possible, but they don't explain how to do it. Would you explain to me exactly how it is done? Thank you for your time.

**R. Hanson
Marysville, WA**

In Applesoft, one of Apple's BASIC languages, the command HGR sets up the following default conditions:

1. The high-resolution graphics mode is turned on, leaving four text lines at the bottom of the screen.
2. The screen is cleared to black, and hi-res page 1 is displayed.
3. The text window is full screen, but only the bottom four text lines are visible below the graphics page. The cursor will still be in the text window, but may not be visible unless it is moved to one of the four bottom lines.

Having graphics and text on the screen at the same time is called the mixed graphics mode. If you really want to show off, use POKE - 16302,0 to set full screen graphics and POKE - 16301,0 to restore mixed graphics mode. A second high-resolution graphics page, called page 2, can be accessed by HGR2.

Learning to program graphics is somewhat complex, but very rewarding. For help, I recommend Applesoft BASIC Programmer's Reference Manual, Volume One and Volume

Earle Hancock directs the microcomputing project at Minuteman Regional Vocational School, Lexington, MA. He has served as an advisor to the Massachusetts Association of Vocational Administrators, and belongs to a number of computer organizations. Write to him c/o inCider, 80 Pine Street, Peterborough, NH 03458.

by Earle Hancock

Two, from Apple Computer Co., or *Graphically Speaking* by Mark Pelczarski, published by Softalk Books.

Q I have an Apple II Plus with 48K, a 16K RAM card, a Grappler card, two disk drives, and a Hayes Micromodem. I recently purchased a Z-80 Plus card that I'm having trouble with. dBase will not boot properly, nor will the CP/M disk (no prompt).

I have tried the card and my 16K RAM card on another Apple and had no difficulty. I have checked my disk drive's speed, removed the other cards, and used different slots with no success. I purchased this machine in November 1981.

I would appreciate any help or suggestions that you could offer me. Thank you.

**J. Striker
Dolton, IL**

A At first blush this problem seems to have no obvious solution. Your approach to the problem is just what I would have recommended. Two somewhat remote possibilities do exist. The first is the alignment of your disk drive. The alignment of the 0 track stopper is critical to the proper operation of the drive. The drive(s) may have been slowly going out of adjustment during the last few months. Disks you have been using regularly may work properly while new ones will not. The reason for this is that the older disks have been recorded by the out-of-adjustment drive so they (the disks) are matched to the drive. The new disks are recorded "to specs" and are less tolerant of your drives. Directions for setting the 0 track alignment stopper can be found in the November "Apple Clinic," page 33.

Try another disk drive on your computer and see if the CP/M or dBase II disks will work. If they don't, then the problem lies in the main logic board.

It is a bit (no pun intended) of a mystery why the computer would appear to operate normally until the Z-80 card is accessed. Perhaps the slot on the main logic board is defective. In any case your dealer can run a

diagnostic test to try to isolate the problem. As a last resort a new main logic board can be installed. If you decide to replace the main logic board ask your dealer to test the operation of the Z-80 in the new main logic board to be sure it all works correctly.

Q First let me say how much I enjoy your magazine. Now let me get to the point. I have a Bell & Howell Apple II (the black Apple) upgraded to a II Plus (Applesoft ROMs and autostart monitor). My keyboard is revision 6.

I'm trying to hook up a "one wire shift key." I have run a wire from the shift key to the PB2 input of the game I/O. When I try to use Magic Window II and select the "one wire shift key" option, all I get is uppercase. Can you shed any light on this?

**G. Loose
Warren, MI**

A This question sounds like an introduction to the wonderful world of, "It's not our fault—check with your other vendors." I wish I had a dollar for every time I've encountered that buck-passing technique.

From your description I'd say that you have correctly installed the "one wire" shift modification. In newer keyboard revisions (the ones with an encoder board piggybacked under the keyboard) the keyboard end of the wire can be alligator-clipped to the second pin from the left of the bank of pins connecting the encoder board to the keyboard. To determine which is left, remove the Apple's cover and look from the rear of the computer toward the keyboard (and the encoder board just under it). The second pin in the set of 25 vertical pins connecting the boards is the shift key pin. Readers with Apples made before encoder boards must attach the wire to pin 53 on the keyboard with solder. In both cases the other end of the wire connects to pin four of the game I/O socket.

Magic Window II is one of many software packages that take advantage of this shift key modification. The software looks at game I/O pin four (push button #2) to see if the

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shift key has been pressed, producing a capital letter.

Keep in mind the Apple II and II Plus generate only uppercase letters for display on the monitor (unless, of course, a lowercase chip has been installed). Magic Window II lets you know you have selected an uppercase letter by displaying it in inverse video, black letters on a white background. The rest of the letters are displayed in uppercase normal video, even though they print in lowercase on your printer. While this situation may seem confusing at first, it becomes so natural after a while that real upper- and lowercase displays look odd in comparison.

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Q My joystick has suddenly started to function part-time. Any suggestions? I will appreciate any information you can give me.

**E. Gholy
Falls Church, VA**

A Considering the punishment that joysticks take, I'm surprised they last as long as they do. It is possible that the joystick connector that plugs into the game I/O port needs cleaning. Try it and test the results.

More likely the failure can be traced to one or more of the wires in the connecting cable. These wires are continually flexed and often break, especially at the point of entry into the body of the joystick. Sometimes the break is such that failures are intermittent. When the joystick acts up, try moving the cord around to see if that corrects the problem. You can open the joystick and check that the solder connections inside are secure.

Older model joysticks used flat ribbon cable. This type of cable is more prone to the failures described above, but it is much easier to repair than the newer round styles. If you suspect a broken wire is the cause of the problem and you have the flat ribbon cable, cut the cable back an inch from the joystick housing and reconnect all the wires. To be sure that the wires are all reconnected to their proper place, remove the old ones as you reconnect the new, one wire at a time.

Most joystick manufacturers are more than willing to repair their products, often at a fraction of the price of a new one. Carefully pack up the joystick, enclose a letter describing the problem and mail it to the maker. You may be pleasantly surprised with the results.

Q In your column in the March 1984 issue of *inCider*, you discuss the modification of a Franklin Ace 1000 with the installation of a RAM card in slot 0. Is it worthwhile? Will it adversely affect the operation of the p-System (not Apple Pascal, but the new Softech IV.13 version)?

I know the 6502 microprocessor can access only 64K of memory

without paging. Would I have to write all of my own drivers to support a modification such as this? I have a BAM-128 by Micro-Tech that I would like to install this way, but I want to know more before I carve up my computer.

Are any other 128K cards more compatible? Exactly what did you install in slot 0, and has it caused any problems? I guess the bottom line of what I'm asking is, what is your recommendation?

**D. A. Vinzant
Frogware Enterprizes
San Diego, CA**

A I understand your reluctance to carve up a working computer. Be not of faint heart; it's really easy. You will have to answer for yourself the question of worth.

The main reason I made the modification was to install an integer BASIC firmware card in slot 0. In the process of testing the compatibility of the modification I tested several RAM cards. All worked as advertised, including the software for disk emulation and memory expansion. I have not tested the Micro-Tech BAM-128; if you will send me their address I will do some research about the card and related software.

With the internal 16K of memory, selected software cannot tell that a switch has been installed. It (the switch) is completely transparent. Of course, if you select slot 0 (one side of the switch) and have a card there, the software may not like the card or may require the now-absent 16K of RAM. If that happens, turn the computer off, flip the switch (select the internal 16K) and re-boot the software.

Any hardware modification carries with it certain risks. Software problems are not included in the risk list for this modification. The bottom line is—I did it to mine and it still works fine. Ribbit.

The Mail Bag

This column depends, for its energy and interesting problems, on you. If you have questions about maintenance or repair, send them to The Apple Clinic, *inCider* magazine, 80 Pine Street, Peterborough, NH 03458. ■



2) the elements are exchanged only once, not on every pass as in the bubble sort.

Listing 4C is one implementation of the insertion sort. Line 20040 "squeezes" the outer loop. **Figure 3** shows the flow of data within the insertion sort.

Table 1 demonstrates that the insertion sort is indeed more efficient than the bubble sort on unordered lists and remarkably more efficient in sorting ordered lists. In fact, the insertion sort is faster than any other sort on ordered lists. It is even faster than the machine language sort I have selected.

Binary Sorts

A binary sort subdivides the list to be sorted into sublists. The computer then sorts the sublist using an exchange sort. It is actually faster to sort two lists of 50 items and merge these lists than to sort one list of 100 elements. Presented here are three varieties of binary sorts: the Shell sort, the tag sort (a variation of the Shell sort), and the quicksort.

Shell Sort

The Shell sort is named for its inventor, Donald Shell. **Listing 4D** is one version of the Shell sort. The Shell sort moves through the list at a prede-

termined interval (line 30060), skipping elements between the intervals. When the pass is finished, the computer exchanges the elements at the beginning and end of the pass (line 30100), selects and repeats itself until all elements have been sorted. **Figure 4** shows the flow of data within the sort. The benchmarks for the Shell sort show that binary sorts are indeed more efficient than exchange sorts.

Tag Sort

Recall from Part 2 of this series that Applesoft BASIC manipulates string arrays very tediously. Each exchange generates two orphaned strings as "garbage" which quickly fills available memory. Frequent garbage collection and the need to actually move strings in memory slow the sorting process to the speed of a sluggardly snail in comparison to most computer operations.

Listing 4E is a tag sort which uses the Shell sort algorithm, but with a twist—no strings in the primary array (A\$) are actually moved. The sort establishes a second, numeric array, S%, which contains the order of the strings in A\$. The computer compares the strings in A\$ and exchanges the values in S%. When the sort is complete, A\$ remains in its original order, while S% contains the alphabetical order of A\$. No strings are moved, no garbage is generated and, as you can see from **Table 1**, the sort is much faster. **Table 2** illustrates the process. If you use the tag sort, the sort array, S%, becomes the subscript of the string array, A\$. In other words, to print the above strings in sorted order, we would use the following loop:

```
10 FOR I=1 TO 5
20 PRINT A$(S%(I))
30 NEXT I
```

Figure 5 is the pattern for the tag sort. Note that the flow of logic is the same as for the Shell sort in **Figure 4**. However, the comparisons of the strings in array A\$(x) are made based on values of x in the sort array S%(i). The strings in A\$ are compared, the values in S% are exchanged.

The tag sort offers us no advantage for small lists. In fact, the time required to establish a sort array (lines 40040–40060) penalizes us. From about 500 items up, however, the tag sort becomes more efficient than the pure Shell sort from which it was de-

Table 1. Comparison of the efficiency of sorting algorithms. The lengths of the lists are in the top row. The numbers in the table are the times each algorithm took to sort the lists.

		10	50	100	500	1000	2000
BASIC SORTS							
BUBBLE SORT	Unordered	1	24	9	3029	20928	?
	Ordered	1	18	73	1791	7236	?
INSERTION SORT (Listing 5-4c)	Unordered	1	8	29	961	7077	?
	Ordered	1	2	3	10	31	365
SHELL SORT	Unordered	1	10	27	364	1975	?
	Ordered	1	4	9	78	136	560
TAG SORT	Unordered	1	13	33	354	974	?
	Ordered	1	13	33	354	974	?
QUICKSORT	Unordered	1	8	17	121	348	2059
	Ordered	1	6	14	90	197	1011
SPECIAL SORTS							
INSERTION SORT (Listing 5-5b)	Ordered	<1	<1	<1	1	3	18
MACHINE LANGUAGE	Unordered	1	2	3	26	98	386
	Ordered	1	2	3	36	98	386

rived. The reason is apparent: The tag sort moves only numeric values. This process takes place in the array variable table, rather than at the top of memory where strings are stored. No garbage collection is necessary, as it is with the Shell sort. If we were sorting strings longer than five characters or if the available free space were less, the breakeven point—the point at which the tag sort becomes more efficient than the pure Shell sort—should drop.

Theoretically, we could adapt the tag sort concept to any sorting algorithm. The only requirement is that we must establish a sort array, S%, dimensioned to the same size as the string array, A\$. The sort array must be initialized similarly to lines 40040–40060 of **Listing 4E**.

Quicksort

The quicksort is the fastest, but also the most complex, of the sort algorithms. **Listing 4F** presents one implementation of the quicksort. Since the quicksort slows down toward the end of each pass, this particular ver-

Listing 4. Program to compare sorting algorithms.

```

10 REM -----
20 REM LISTING 5-4A
30 REM -----

40 HOME
50 CLEAR
60 DIM A$(2002)
70 D$ = CHR$(4)
80 PRINT "SORT BENCHMARKS"
90 PRINT "-----"
100 PRINT
110 PRINT "1 -- BUBBLE SORT"
120 PRINT "2 -- INSERTION SORT"
130 PRINT "3 -- SHELL SORT"
140 PRINT "4 -- TAG SORT"
150 PRINT "5 -- QUICKSORT"
160 PRINT "6 -- GENERATE SORTED TEXT"
170 VTAB 22
180 PRINT "WHICH CHOICE? ";
190 GET A$
200 X = VAL(A$)
210 IF X < 1 OR X > 6
    GOTO 190
220 PRINT CHR$(1)
230 HOME
240 ON X GOTO 250, 260, 270, 280, 290, 300
250 PRINT "BUBBLE SORT"
    : GOTO 310
260 PRINT "INSERTION SORT"
    : GOTO 310

```

Listing continued.

Table 2. The tag sort process.

UNSORTED			SORTED		
Array	String	S%	Array	String	S%
Order			Order		
1	ONE	1	1	ONE	3
2	TWO	2	2	TWO	5
3	THREE	3	3	THREE	4
4	FOUR	4	4	FOUR	2
5	FIVE	5	5	FIVE	1

Figure 2. Bubble sort flowchart.

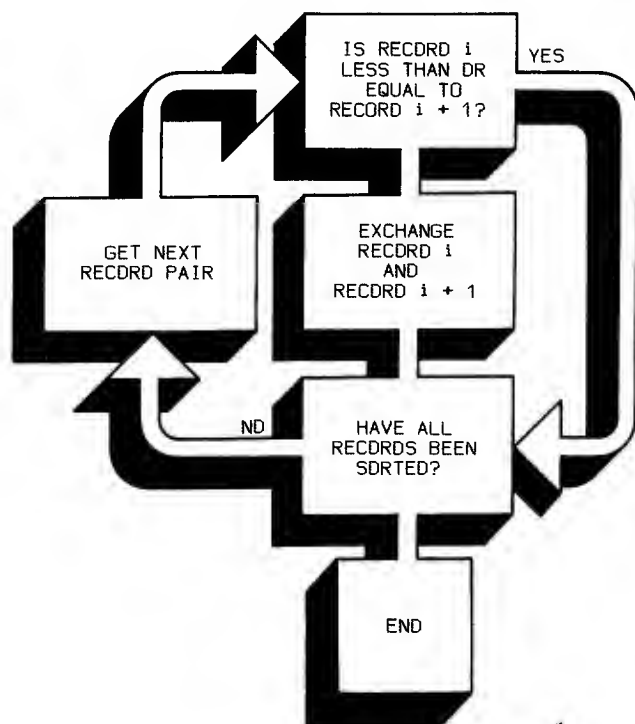
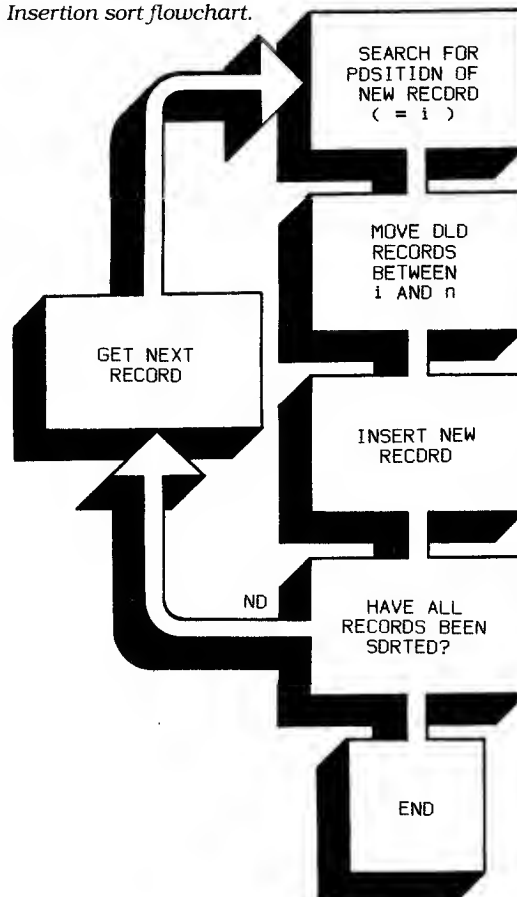


Figure 3. Insertion sort flowchart.





Listing continued.

```

270 PRINT "SHELL SORT"
: GOTO 310
280 PRINT "TAG SORT"
: GOTO 310
290 PRINT "QUICKSORT"
: GOTO 310
300 PRINT "GENERATE SORTED TEXT"
310 PRINT "-----"
320 PRINT
330 IF X = 4
    THEN DIM S%(2002)
340 IF X = 5 OR X = 6
    THEN DIM SP%(1000)
350 IF X = 6
    THEN Y = 6
: GOTO 370
360 FOR Y = 1 TO 6
370 NR = VAL(MID$("001000500100050010002000", 4
    * Y - 3, 4))
380 GOSUB 5000
390 IF X = 6
    THEN GOSUB 6000
: GOTO 10
400 A$(NR) = "MMMM"
410 GOSUB 5000
420 NEXT Y
430 VTB 22
440 PRINT "PRESS ANY KEY TO CONTINUE...";
450 CALL - 756
999 GOTO 10
5000 PRINT D$"OPEN UNSORTED TEXT"
5010 PRINT D$"READ UNSORTED TEXT"
5020 FOR I = 1 TO NR
5030 INPUT A$(I)
5040 NEXT I
5050 PRINT D$"CLOSE"
5060 PRINT D$"PR#5"
: PRINT D$"IN#5"
5070 INPUT " ";T0$
5080 PRINT D$"PR#0"
: PRINT D$"IN#0"
5090 ON X GOSUB 10000, 20000, 30000, 40000, 50000, 50000
5100 PRINT D$"PR#5"
: PRINT D$"IN#5"
5110 INPUT " ";T1$
5120 PRINT D$"PR#0"
: PRINT D$"IN#0"
5130 T0 = 3600 * VAL(MID$(T0$, 7, 2)) + 60 * VAL(MID$(
    T0$, 10, 2)) + VAL(MID$(T0$, 13, 5))
5140 T1 = 3600 * VAL(MID$(T1$, 7, 2)) + 60 * VAL(MID$(
    T1$, 10, 2)) + VAL(MID$(T1$, 13, 5))
5150 PRINT "NR= "NR"; TAB(10)"TIME= "T1 - T0" SECONDS"
5160 RETURN
6000 PRINT D$"OPEN SORTED TEXT"
6010 PRINT D$"WRITE SORTED TEXT"
6020 FOR I = 1 TO NR
6030 PRINT A$(I)
6040 NEXT I
6050 PRINT D$"CLOSE"
6060 RETURN

10000 REM -----
10010 REM LISTING 5-4B
10020 REM BUBBLE SORT
10030 REM -----

10040 FOR I = 1 TO NR - 1
10050 L = NR - I
10060 FOR J = 0 TO L
10070 IF A$(J) > A$(J + 1)
    THEN B$ = A$(J)
    : A$(J) = A$(J + 1)
    : A$(J + 1) = B$
10080 NEXT J, I
10090 RETURN

20000 REM -----
20010 REM LISTING 5-4C
20020 REM INSERTION SORT
20030 REM -----

20040 FOR I = 1 TO NR - 1
20050 B$ = A$(I + 1)
20060 FOR J = I TO 1 STEP - 1
20070 IF B$ < A$(J)
    THEN A$(J + 1) = A$(J)
    : NEXT J
    : J = 0
    A$(J + 1) = B$
20080 NEXT I
20090 RETURN
20100 RETURN

30000 REM -----
30010 REM LISTING 5-4D
30020 REM SHELL SORT
30030 REM -----

```

```

30040 I = 1
30050 I = 2 * I
: IF I <= NR
    GOTO 30050
30060 I = INT(I / 2)
: IF I = 0
    THEN RETURN
30070 FOR L = 1 TO NR - I
30080 J = L
30090 K = I + J
30100 IF A$(J) > A$(K)
    THEN B$ = A$(J)
    : A$(J) = A$(K)
    : A$(K) = B$
    : J = J - I
    : IF J > 0
        GOTO 30090
30110 NEXT
30120 GOTO 30060

40000 REM -----
40010 REM LISTING 5-4E
40020 REM TAG SORT
40030 REM -----

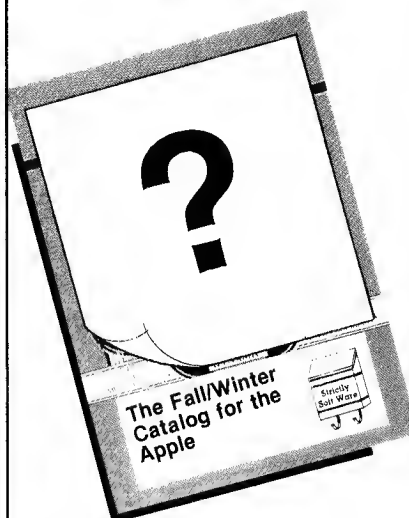
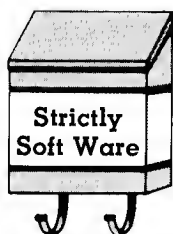
40040 FOR I = 1 TO NR
40050 S%(I) = I
40060 NEXT I
40070 I = 1
40080 I = 2 * I
: IF I <= NR
    GOTO 40080
40090 I = INT(I / 2)
: IF I = 0
    THEN RETURN
40100 FOR L = 1 TO NR - I
40110 J = L
40120 K = I + J
40130 IF A$(S%(J)) > A$(S%(K))
    THEN T$ = S%(J)
    : S%(J) = S%(K)
    : S%(K) = T$
    : J = J - I
    : IF J > 0
        GOTO 40120
40140 NEXT L
40150 GOTO 40090

50000 REM -----
50010 REM LISTING 5-4F
50020 REM QUICKSORT
50030 REM -----

50040 L = 1
50050 SP%(L) = NR + 1
50060 M = 1
50070 J = SP%(L)
50080 I = M - 1
50090 IF J - M < 3
    GOTO 50230
50100 M1 = INT((I + J) / 2)
50110 I = I + 1
50120 IF I = J
    GOTO 50180
50130 IF A$(I) <= A$(M1)
    GOTO 50110
50140 J = J - 1
50150 IF I = J
    GOTO 50180
50160 IF A$(J) < A$(M1)
    THEN B$ = A$(I)
    : A$(I) = A$(J)
    : A$(J) = B$
    : GOTO 50110
50170 GOTO 50140

50180 IF I > M1
    THEN LET I = I - 1
    IF J < > M1
    THEN B$ = A$(I)
    : A$(I) = A$(M1)
    : A$(M1) = B$
    L = L + 1
    SP%(L) = I
    GOTO 50070
50230 IF J - M > 2
    THEN IF A$(M) = > A$(M + 1)
        THEN B$ = A$(M)
        : A$(M) = A$(M + 1)
        : A$(M + 1) = B$
        : A$(M + 1) = B$
        IF A$(M) < A$(M + 1)
            GOTO 50250
50250 M = SP%(L) + 1
50260 L = L - 1
50270 IF L > 0
    GOTO 50070
50280 RETURN

```



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IC



sion uses a simple exchange sort for the last three elements (line 50230). This version also uses a stack pointer (SP%) to keep track of its strings, similar to the tag sort, but it only stores pointers in the stack temporarily.

The quicksort part of the sort divides the list into sublists, as do all binary sorts. From there on things get pretty complicated. The computer exchanges the first and middle items in the sublist. It then scans from the beginning of the list until it finds an item greater than the new first item. The computer then scans backwards from this point until it finds an item smaller than the new first item. It then exchanges the lesser and greater elements that it found. This process continues until the two scans intersect.

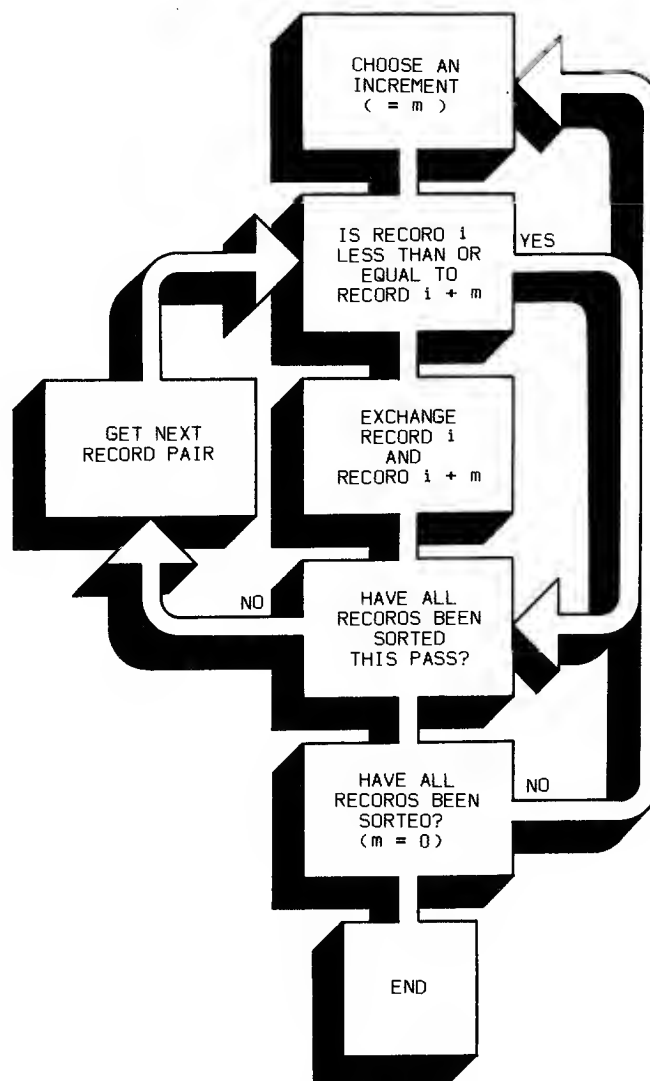
The sort then selects a new sublist and repeats the process. Finally, the computer merges the sorted sublists, using the same process as was used to sort the sublists. See, I told you quicksort was complex. But it works. And it works well.

Figure 6 shows how things work. Even a casual comparison with other flowcharts will reveal that it is by far the most complex algorithm we are studying. It is also the fastest. The sort times in **Table 1** speak for themselves.

Insertion Sort Revisited

In Part 6 I will discuss methods of searching. In the process, you will discover that ordered lists make life a lot easier. In the benchmarks above, the

Figure 4. Shell sort flowchart.



insertion sort does extremely well with ordered lists. The insertion sort makes lots of comparisons but only moves data once, when it finds the place to insert the new data element. But if the list is ordered already, we only need to search through the list once, find the proper place for the new element and insert it. All the other passes through the list are superfluous. So, let's design a single-pass insertion sort for adding new elements to an ordered list.

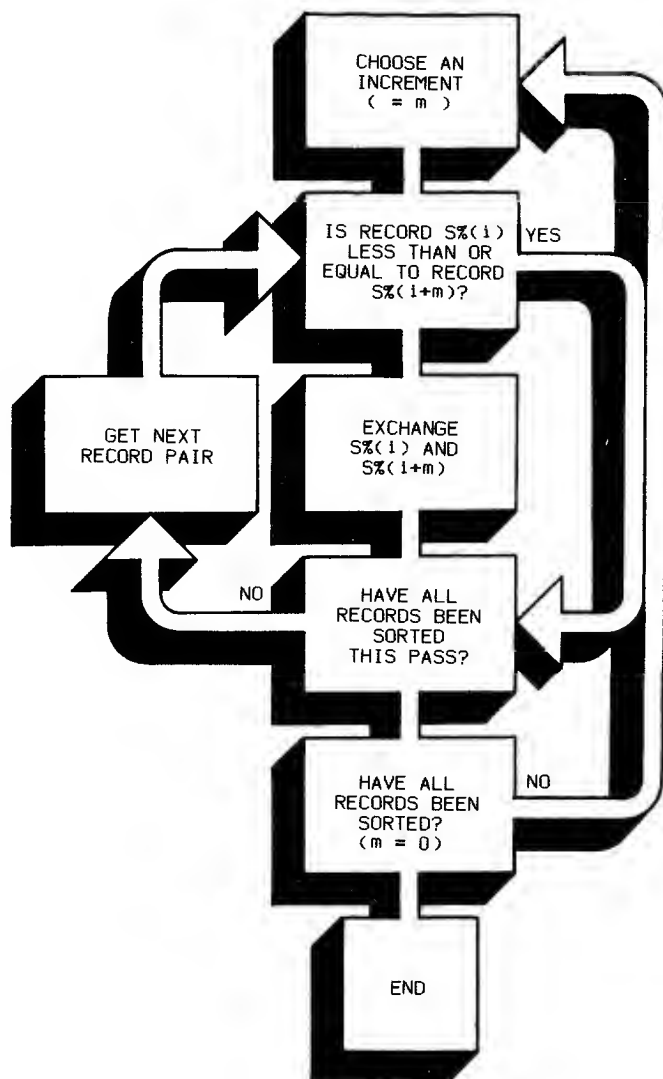
Figure 7 illustrates the process. The computer goes through the list once, no loops (except, of course, to move data elements to make space for the new elements).

Listing 5B is one version of this single-pass insertion sort algorithm.

Loop 1 (lines 63050-63090) finds the proper place in the list for the new element, B\$. Loop 2 (lines 63100-63160) and loop 3 (lines 63170-63200) move existing elements. Loop 2 applies if B\$ is the first element in the new list; loop 3 if it is not. Line 63210 inserts element B\$ in old list A\$(x) and makes it part of new list A\$(x + 1).

Listing 5A tests the performance of the insertion sort in **Listing 5B**. To test the algorithm, you must have created a sorted text file using **Listing 4**. After you have done this, enter and run **Listing 5**. The improvement in efficiency will knock your socks off! Eighteen seconds to add an element to a 2000 word list! Even the machine language sort can't compete. The change is due, of course, to the once-

Figure 5. Tag sort flowchart.



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through concept and the absence of garbage.

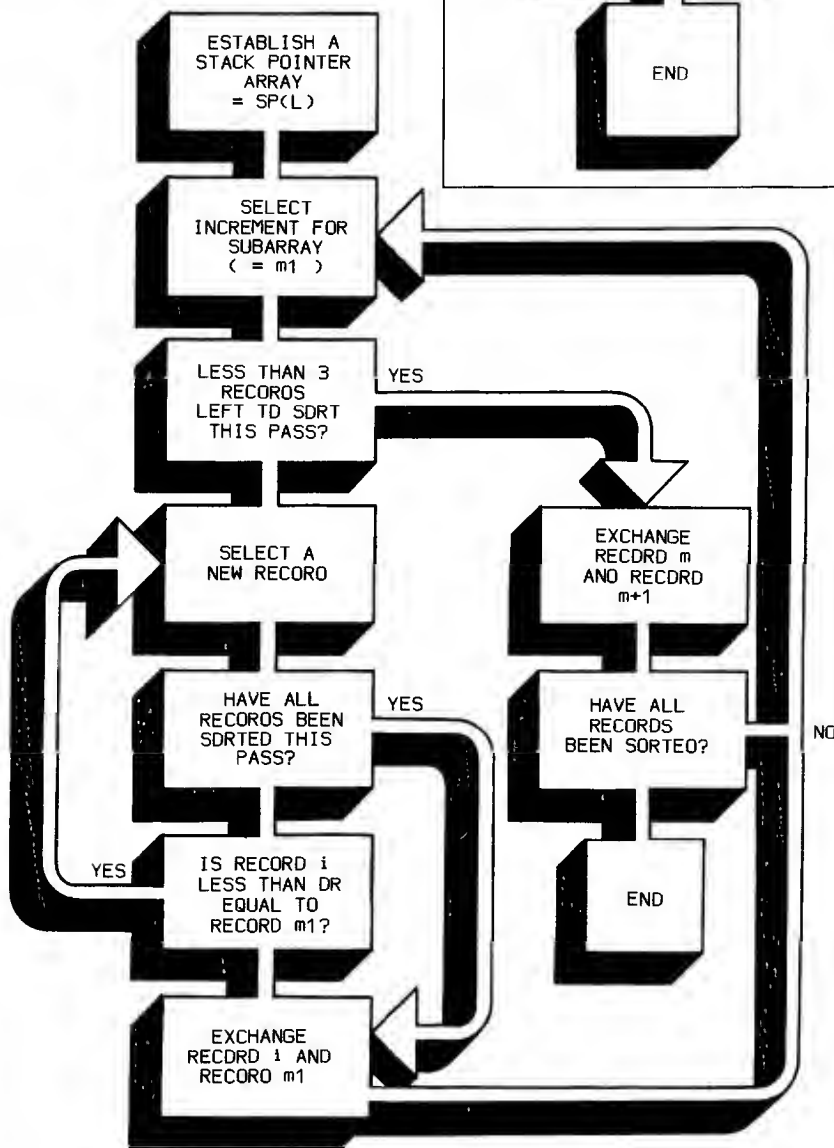
Machine Language Sorts

We have examined the effects of three factors on sort efficiency: the sorting method, the number of items to be sorted, and their arrangement prior to sorting. Our discussion so far has been limited to the BASIC language. But Applesoft allows us to access machine language from BASIC, using the CALL command. So we have an additional option: We can write a BASIC program with a machine language sort. This alternative is so attractive that numerous versions of it exist.

Figure 7. Single-pass insertion sort flowchart.



Figure 6. Quicksort flowchart.



To demonstrate the adverse effect Applesoft string handling has on sorting, **Table 1** includes the times for sorting our lists using a machine language sort similar to the tag sort above. The sort gains its speed in two ways:

1) comparisons are made without having to pass through the Applesoft interpreter, and

2) no strings are moved.

The first characteristic is inherent

to all machine language sorts. The second characteristic is a feature unique to the tag sort.

Conclusions

Figures 8 and 9 graph the results of my tests for unordered and ordered lists, respectively. Most of the results of our benchmarks are predictable; a few are surprising. As expected, the bubble sort is a loser in all cases. It is virtually useless except as a demonstration.

Listing 5. Single-pass insertion sort algorithm.

```

10 REM -----
20 REM LISTING 5-5A
30 REM -----

40 HOME
50 DIM A$(2002)
60 PRINT "INSERTION SORT (PRESORTED TEXT)"
70 PRINT "-----"
80 FOR Y = 1 TO 6
90   NR = VAL(MID$("001000500100050010002000", 4
   * Y - 3, 4))
100  D$ = CHR$(4)
110  B$ = "LMNDP"
120  GOSUB 10000
130  NEXT Y
999  END
10000 PRINT D$"OPEN SORTED TEXT"
10010 PRINT D$"READ SORTED TEXT"
10020 FOR I = 1 TO NR
10030 INPUT A$(I)
10040 NEXT I
10050 PRINT D$"CLOSE"
10060 PRINT D$"PR#5"
   : PRINT D$"IN#5"
10070 INPUT " ";T0$
10080 PRINT D$"PR#0"
   : PRINT D$"IN#0"
10090 GOSUB 63000
10100 PRINT D$"PR#5"
   : PRINT D$"IN#5"
10110 INPUT " ";T1$
10120 PRINT D$"PR#0"
   : PRINT D$"IN#0"
10130 T0 = 3600 * VAL(MID$(T0$, 7, 2)) + 60 * VAL(MID$(
   T0$, 10, 2)) + VAL(MID$(T0$, 13, 5))
10140 T1 = 3600 * VAL(MID$(T1$, 7, 2)) + 60 * VAL(MID$(
   T1$, 10, 2)) + VAL(MID$(T1$, 13, 5))
10150 PRINT "NR="NR; TAB(10)"TIME="T1 - T0" SECONDS"
10160 RETURN

63000 REM -----
63010 REM LISTING 5-5B
63020 REM -----

63030 NR = NR + 1
63040 IF B$ >= A$(NR - 1)
   THEN I = NR
   : GOTO 63150
63050 REM ** LOOP 1 **

63060 FOR J = NR - 1 TO 1 STEP - 1
63070 I = J
63080 IF B$ >= A$(I)
   GOTO 63180
63090 NEXT J

63100 REM ** LOOP 2 **

63110 FOR K = NR TO 2 STEP - 1
63120 A$(K) = A$(K - 1)
63130 NEXT K
63140 I = 1
63150 A$(I) = B$
63160 GOTO 63220

63170 REM ** LOOP 3 **

63180 FOR K = NR TO I + 1 STEP - 1
63190 A$(K) = A$(K - 1)
63200 NEXT K
63210 A$(I + 1) = B$
63220 RETURN

```

AMPERGRAPH

AMPERGRAPH is a powerful, easy-to-use relocatable graphics utility for the Apple II +/e. AMPERGRAPH adds twenty-two Applesoft commands that allow effortless generation of professional-looking plots of scientific or financial data. All of the necessary scaling and screen formatting is accomplished with just a few, simple Applesoft lines.

Unlike most other plotting systems for the Apple II which are stand-alone systems, the AMPERGRAPH utility provides extended BASIC graphics language macros that you can use directly in your own Applesoft programs. The additional commands are &SCALE, &LIMIT, &AXES, &GRID, &FRAME, &LOG X, &LOG Y, &LABEL AXES, &LABEL, &VLABEL, &CENTER LABEL, &CENTER VLABEL, &DRAW, &PENUP, &CROSS, &OPEN SQUARE, &CLOSED SQUARE, &OPEN CIRCLE, &CLOSED CIRCLE, &ERROR BARS, &DUMP (to dump the graph on a Silentyper printer) and &*DUMP (to link with AMERDUMP, see below).

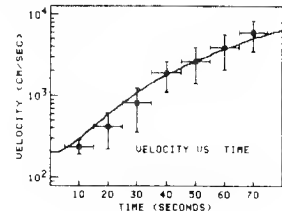
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SAMPLE AMPERGRAPH PROGRAM LISTING:

```

10 &SCALE, 0, 80, 80, 13000
15 LX$ = "TIME (SECONDS)";LY$ = "VELOCITY (CM/SEC)"
20 &LOG Y: &LABEL AXES, 10, 10
25 LABELS = "VELOCITY VS. TIME":&LABEL, 30, 200
30 FOR T = 0 TO 80:&DRAW, T, 150 + T/2:NEXT T
35 FOR T = 10 TO 70 STEP 10
40 &CLOSED SQUARE, T,
   (150 + T/2)*(8 + 4*RND(3))
45 &ERROR BARS, 5, T/2
50 NEXT T:&DUMP

```



AMPERDUMP

AMPERDUMP is a high-resolution graphics dump utility which can be used either in menu-driven mode, or directly from your Applesoft program, with or without AMPERGRAPH. The following printers will work with AMPERDUMP: Epson MX-80, FX-80, MX-100; Apple DMP, NEC PC-8023A-C, C. ITOH 1550, 8510A/B, 8600. AMPERDUMP offers many features which are not available in other graphics dump routines:

- * Horizontal magnifications 3 with Epson printers (2.33 to 6.99 inches), 12 with all others (1.75 to 7.78 inches)
- * Vertical magnifications 9 with Epson printers (0.88 to 7.96 inches), 6 with all others (1.33 to 8.00 inches)
- * Horizontal and vertical magnifications can be specified independently
- * Normal / Inverse dumps
- * Adjustable horizontal tab
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- * Easy to use
- * Compatible with AMPERGRAPH
- * Relocatable

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The AMPERGRAPH and AMPERDUMP graphics utilities require an Apple II +/e (or Apple II with language card). The AMPERDUMP utility requires one of the following interface cards: Epson, Apple, Grappler, Interactive Structures, Mountain Computer, Epson Type2, Tymac, or Microbuffer II.

AMPERGRAPH and AMPERDUMP are available from your dealer or order direct. Include \$2.00 for shipping and handling. Wisconsin residents add 5% sales tax.

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Figure 8. Comparative times for sorting unordered lists.

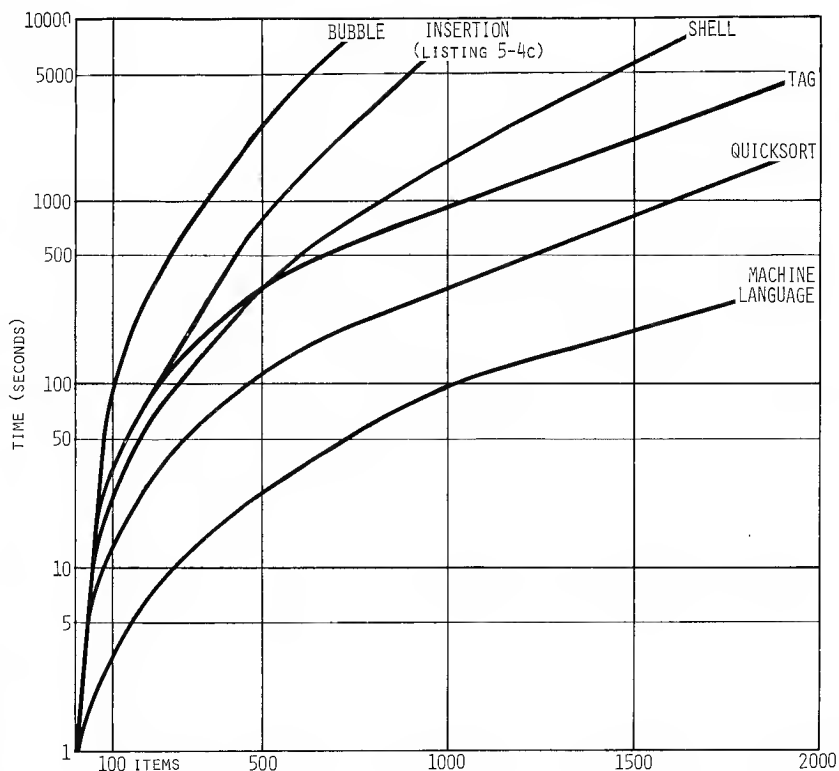
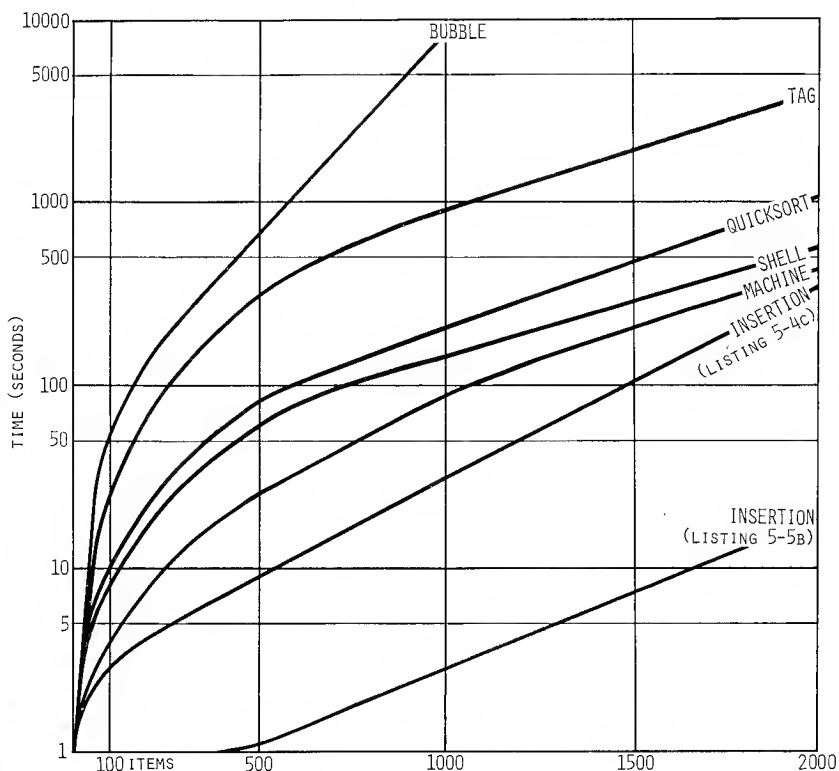


Figure 9. Comparative times for sorting ordered lists.



For small lists, any of the sorts would be acceptable. For large lists of unordered items, the quicksort or some form of machine language sort would be of great use.

All the BASIC sorts improved when working with ordered lists. The bubble sort, tag sort, and quicksort improved slightly. This is largely due to the decreased garbage collection times resulting from fewer exchanges (fewer unordered items, remember).

The machine language sort does not change. It must make the same number of comparisons as with the unordered list.

The big shock concerns the insertion sort. The sort is dramatically more efficient with ordered lists. In fact the insertion sort in **Listing 4C** is more efficient than any other sorting algorithm, even machine language. The single-pass insertion sort in **Listing 5B** is virtually instantaneous for all but the largest lists.

Further Reading

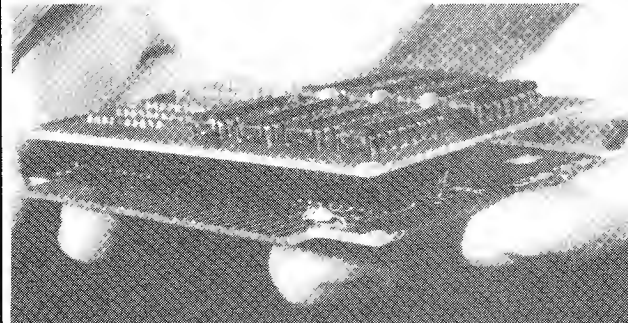
- "Speed Sort," *Nibble*, Volume 3, Number 2.
- "About Sorts," *Interface Age*, August/September 1981.
- "All Sorts of Basic Sorts," *Compute!*, December 1982.
- "Amper Jump and Tsort," *Nibble*, Volume 2, Number 6.
- "Quicksort," *Nibble*, Volume 3, Number 4.
- "Sort 'em Out," *Nibble*, Volume 1, Number 1.
- "Improving the Multiple Array Sort," *Nibble*, Volume 1, Number 3.
- "More Speed for the Multiple-Array Sort," *Nibble*, Volume 2, Number 3.
- "Computing Ten Sort Algorithms," *Call A.P.P.L.E.*, October 1980.
- "Quicksort," *Kilobaud Microcomputing*, April 1979.
- "Searching Techniques Part 4," *Creative Computing*, December 1982.

More to Come . . .

I trust that you haven't found this subject too sordid. The references above indicate how much more could and has been said on sorting. Selection of sorting algorithms and data organization are crucial to writing a successful program. Next month we will search through searching techniques. ■

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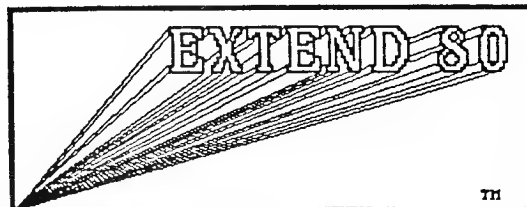
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Coded Patchwork for The Inspector

The Inspector and Watson, two Apple utilities by Omega Software (222 S. Riverside Plaza, Chicago, IL 60606) are invaluable aids for examining your Apple's memory, as well as for general disk maintenance and snooping. I purchased The Inspector when I had my Apple II Plus and I continue to use both programs daily. The programs come in both hard- and software versions. The former must be plugged into the D0 and D8 ROM slots on an Integer BASIC card or the motherboard of the original Apple II. The latter can be installed in the area \$D000.DFFF of a language card on a II Plus or a //e. Both programs interface automatically with Locksmith, Omega's "other" utility.

When I purchased my //e, I discovered that the screen display sometimes got messed up—not much, but just enough to be annoying. I wrote Omega about the problem and I never received a reply. Since it was only a minor problem and there were ways to avoid it, I never pursued the matter—not until curiosity nagged me as to why the display was being spoiled.

It turns out that the problem is The Inspector. He makes a call dur-

ing the screen display to a routine in the Apple's monitor called CLEOP1 (\$FC46)—a second entry point for the routine that clears the screen from the cursor position to the end of the page. The call is a single one at \$DBDD in The Inspector's code.

Unfortunately, the CLEOP1 routine was removed from the //e's monitor ROM and relocated into the 80-column ROM hardware where it isn't as accessible. I considered duplicating the CLEOP1 code in the space occupied by The Inspector/Watson, but there wasn't enough room. The Inspector has only ten unused bytes at \$DFF6.DFFF and Watson may have six unused bytes at \$D752.D7B7. I say "may" because I can't find anything that references those six bytes, but nevertheless, they are code. Since CLEOP1 needs 18 bytes (19 as it turns out) there was no way to squeeze it into that space.

I was left with no choice but to locate CLEOP1 somewhere else in memory. Once I'd decided to move the code, there were many places to put it. I wanted it to be somewhere that wouldn't get walked on by DOS or anybody else. I finally chose to put the routine on top of the tape write routine in the monitor at \$FECD.

(Why Apple chose to relocate other useful routines, but leave all the useless tape I/O in place is anybody's guess. Maybe someone should ask Rick and Bryan, whose names are permanently burned into the //e's ROM.) You'll find the code in **Listing 1**.

You only need to make one change in The Inspector. Change DBDD- 20 46 FC (jump to \$FC46, the old CLEOP1) to DBDD- 20 CD FE (jump to \$FECD, the CLEOP1 patch).

You can do this in several ways. The simplest appears in **Listing 2**. Remember to hit return at the end of each line. Now when you boot your master disk and load Integer BASIC, it will automatically load The Inspector/Watson and the patched monitor.

Another way is to use something like the Applesoft LOAD INTBASIC program in **Listing 3**.

You can put the patch anywhere as long as you change the JSR address at \$DBDD.DBDF. There are plenty of holes in DOS or Integer BASIC large enough to hold this bit of code.

If you have any software that ran fine on an Apple II but behaves strangely on a //e, chances are that non-standard calls like this one are being made to the old (pre-//e) Apple \$F800 monitor. If you can make a disassembly of the program, check for any JMP's, JSR's, LDA's, and so on, to addresses in the range \$F800.FFFF, and then compare the

Listing 1. The CLEOP1 routine from the monitor ROM. This is the routine we want to relocate.

FECF- 48	FHA	{save current line #}
FECE- 20 24 FC	JSR \$FC24	{calculate the base address}
FED1- 20 9E FC	JSR \$FC9E	{clear to end of line & set carry}
FED4- A0 00	LDY #00	{clear from left col for rest of page}
FED6- 68	PLA	{current line #}
FED7- 69 00	ADC #00	{clever way of incrementing the A-reg}
FED9- C5 23	CMP #23	{#23 holds bottom of text window}
FEDB- 90 F0	BCC \$FECD	{not there yet so keep at it...}
FEDD- 4C 22 FC	JMP \$FC22	{else exit thru MON.VTAB}

Address correspondence to Bob Bragner at Kandilli, Iskele Caddesi 49/3, Istanbul, Turkey.

by Bob Bragner

code at those addresses in the //e monitor listing with that in the older monitor. You'll probably find your bug there. Finding a place for your patch is a different problem. Make sure nobody else uses the same place. ■

As we prepared this article for publication, we received the following note from Bob Bragner. GPLE users will want to read on before they try his Inspector/Watson patch.

—the editors

"I wanted the patch to be somewhere it wouldn't get walked on by DOS or anybody else."

Recently I discovered the hard way that the \$F800 monitor area of the language card isn't as safe as I thought. If you have Neil Konzen's Global Program Line Editor (GPLE) lurking somewhere on your Apple //e and happen to turn on the 80-column screen by means of the control-V command, the patch given above is wiped out. Apparently GPLE moves a copy of the original monitor ROM into the language card space every time it activates the 80-column screen. (It takes no chances.) Since The Inspector is unaware of the switch, he blithely calls the routine at \$FECD and the Apple hangs up waiting for you to turn your tape recorder on.

So, we have to find another home for our patch. There are lots of holes in DOS, but you never can tell when someone else might use one of them. The tape I/O routines in Integer BASIC look inviting, but we've been burned once.

In the Integer BASIC file from \$F425 to \$F4FB dwells a mysterious creature called "Apple II Floating Point Routines." A copy of this beast has been sold along with every copy of Integer BASIC since day one. The only documentation I have seen is the commented disassembly on pages 94-95 of the ancient *Apple Red Book* (January 1978). Nobody calls these routines, because hardly anybody knows they're there and the rest of us have forgotten. We have 215 whole bytes there to gam-

bol around in, and for the time being they're all ours.

We'll put the CLEOP1 patch at

\$F425. See **Listing 4**. If you use the Applesoft LOAD INTBASIC program, change it as in **Listing 5**.

Listing 2. Changing The Inspector from the monitor.

```
{from BASIC}
CALL -151
C083 C083
FECD:48 20 24 FC 20 9E FC A0 00 68 69 00 C5 23 90 F0 4C 22 FC
DBDD:20 CD FE
{control-C to re-enter BASIC}
BSAVE INTBASIC,A$D000,L$3000
```

Listing 3. Incorporating The Inspector changes into the Applesoft LOAD INTBASIC program.

```
10 REM LOAD INTBASIC (//e)
20 D$ = CHR$ (4)
30 TEXT
40 HOME
50 PRINT "DOS Version 3.3e"
60 PRINT "Apple //e"
70 X = PEEK (49281) + PEEK (49281): REM Write enable card: $C0B1
80 VTAB 10: HTAB 2: PRINT "(Loading Integer into Language Card)"
90 PRINT D$"LOAD INTBASIC": REM A$D000, L$3000
100 REM Patch Inspector to work on //e
110 POKE 56285,32: POKE 56286,205: POKE 56287,254: REM Poke JSR $FECD
into $DBDD,DBDF
120 FOR I = 65229 TO 65247
130 REM Data for CLEOP1
140 DATA 72, 32, 36, 252, 32, 158, 252, 160, 0, 104, 105, 0, 197, 35,
144, 240, 76, 34, 252
150 READ X: POKE I,X
160 NEXT I
170 X = PEEK (49282): REM Write protect the card: $C082
180 HOME : PRINT D$"CATALOG"
```

Listing 4. Changing The Inspector to avoid conflicts with GPLE.

```
F425:48 20 24 FC 20 9E FC A0 00 68 69 00 C5 23 90 F0 4C 22 FC
DBDD:20 25 F4
```

Listing 5. Changes in the Applesoft LOAD INTBASIC program to avoid conflicts with GPLE.

```
110 POKE 56285,32: POKE 56286,37: POKE 56287,244: REM Poke JSR $F425
into $DBDD,DBDF
120 FOR I = 62501 TO 62519
```


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Professional Numbers

For the programmer trying to attain professional-looking results in programs, this subroutine will modify any number including zero, decimals, and negative numbers. The modification rounds to the nearest cent, embeds commas, adds dollar signs, and encloses negative numbers in parentheses.

To use the subroutine in your own programs, all you have to do is assign the number you want modified as the variable N and GOSUB to the subroutine. The number will then be modified and returned as N\$. To see how the subroutine works, type in the following line, type in the subroutine, and then run the program.

```
10 INPUT "NUMBER? ";N: GOSUB
10000: VTAB PEEK (37):
HTAB 39-LEN (N$): PRINT N$:
PRINT : GOTO 10
```

Only one problem may occur in modifying a number. Since the computer will convert any number greater than 999,999,999 to exponential form, you will get unwanted results if you assign N to a larger number. You probably won't have to worry about this, because a number any larger would be unrealistic in most programs.

If you have to modify the subroutine, the following information may be helpful. Lines 10000 to 10060 convert N to N\$ and modify N\$ to a uni-

form appearance. Lines 10070 to 10080 embed the commas by splitting N\$ into two halves and inserting a comma in the middle. You should note that commas can be in only two locations in the largest possible number (999,999,999). Lines 10090 to 10100 add a dollar sign and, if the number is negative, enclose it in parentheses. ■

Write to Damien Lindauer at P.O. Box 592, Oroville, WA 98844.

Figure. Examples of "professional" numbers.

	REGULAR	MODIFIED
1.	33.999	\$34.00
2.	581235.822	\$581,235.82
3.	-.83942	\$(0.84)
4.	5	\$5.00
5.	85328.3	\$85,328.30
6.	0	\$0.00
7.	5821.3498	\$5,821.35
8.	999999999	\$999,999,999.00
9.	-.5	\$0.50
10.	.999555	\$1.00
11.	-2589.7899	\$(2,589.79)
12.	8025.256	\$8,025.26
13.	.369	\$0.37
14.	5.5	\$5.50
15.	58	\$58.00
16.	823992	\$823,992.00
17.	805.1111	\$805.11
18.	9.999	\$10.00
19.	-1.2	\$(1.20)
20.	82.9135	\$82.91

Program listing. Professional Numbers subroutine.

```
10000 N = INT (N * 100 + .5) / 100: N$ = STR$ (N): IF N < 0 THEN N$ = RIGHT$
(N$, LEN (N$) - 1)
10010 IF N = 0 THEN GOTO 10060
10020 IF LEFT$ (N$,1) = "." THEN N$ = "0" + N$
10030 IF LEN (N$) < 3 THEN GOTO 10060
10040 IF MID$ (N$, LEN (N$) - 2,1) = "." THEN GOTO 10070
10050 IF MID$ (N$, LEN (N$) - 1,1) = "." THEN N$ = N$ + "0": GOTO 1007
0
10060 N$ = N$ + ".00"
10070 IF LEN (N$) > 6 THEN N$ = LEFT$ (N$, LEN (N$) - 6) + "," + RIGHT$
(N$,6)
10080 IF LEN (N$) > 10 THEN N$ = LEFT$ (N$, LEN (N$) - 10) + "," + RIGHT$
(N$,10)
10090 IF N < 0 THEN N$ = "(" + N$ + ")"
10100 N$ = "$" + N$
10110 RETURN
```

by Damien Lindauer

APPLE EXTRACT

A reprise of the reviews that have appeared in inCider in the last six months.

- | | |
|------|-----------------|
| ★★★★ | Superlative |
| ★★★ | Above average |
| ★★ | Good |
| ★ | Not recommended |
| | Stay away |

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Ask Micro, P.O. Box 1100, 100 Blue Ravine Road, Folsom, CA 95630

Business, March '84.

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Peachtree Software, Inc., 3445 Peachtree Road N.E., Atlanta, GA 30326

Business, February '84.

No one likes paying out money, but this program at least does it well. CP/M only.

Accounts Receivable

★★★★★

BPI Systems, 3423 Guadalupe, Austin, TX 78705

Business, June '84.

Get a handle on your business. This package does what an AR package should.

Accounts Receivable

★★★★★

Peachtree Software, Inc., 3445 Peachtree Road N.E., Atlanta, GA 30326

Business, February '84.

Keep track of who owes you what. Requires a Microsoft Softcard.

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★★★★★

Developmental Learning Materials, One DLM Park, Allen, TX 75002

Education, February '84.

Arcade style word games that are simple to use and educational, too.

Beagle Basic

★★★★★

Beagle Bros., Inc., 4315 Sierra Vista, San Diego, CA 92103

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★★★★★

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Chivalry

★★★★★

Weekly Reader Software, 245 Long Hill Road, Middletown, CT 06457

Arcade game, June '84.

Beautiful graphics enhance this game set in days of yore. A great game for kids.

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Circadian Software, Inc., Box 1208, Melbourne, FL 32902

Word processor, May '84.

A low cost WP with a lot of professional features. Ideal for students and small businesses.

College Board SAT Preparation

★★★★★

Krell Software, 1320 Stony Brook Road, Stony Brook, NY 11790

Education, February '84.

Krell guarantees a 70 point increase in SAT scores. Care to take them up on it?

Crypto Cube

★★★★★

Designware, 185 Berry Street, Building 3, Suite 158, San Francisco, CA 94107

Education, February '84.

A game for ages 8-adult that puts the fun back into spelling.

Cubit

★★★★★

Micromax, 6868 Nancy Ridge Drive, San Diego, CA 92121

Arcade game, May '84.

An Apple clone of Q-Bert. Explore the mysteries of pyramid power.

Cut & Paste

★★★★★

Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403

Word processor, May '84.

A lot of features for a little money. A good value for computer novices.

The Data Bank

★★★★★

FlowerSoft, 564 Tara, Manteca, CA 95336

Data base, January '84.

A friendly information handling program. Surprisingly fast for a program written in Applesoft.

Death in the Caribbean

★★★★★

Micro Fun, 2699 Skokie Valley Road, Highland Park, IL 60053

Adventure game, April '84.

Danger lurks everywhere in this hi-res adventure. After playing this, snow won't seem so awful after all.

Disk Quick

★★★★★

Beagle Bros., Inc., 4315 Sierra Vista, San Diego, CA 92103

Utility, June '84.

Turn the extended 80 column card in your //e into a RAM disk.

Early Music Games

★★★★★

Counterpoint Software, Inc., Suite 218, 4005 W. 65th Street, Minneapolis, MN 55426

Education, February '84.

Music education for ages 4-10. Music Theory 101 was never this much fun.

Financial Planning for VisiCalc

★★★★★

Howard W. Sams and Company, 4300 W. 62nd Street, Indianapolis, IN 46268

Business, February '84. A set of 18 VisiCalc templates which perform financial calculations. A good value.

Font Downloader and Editor

★★★★★

Micro-Ware Distributing, Inc., Box 113, Pompton Plains, NJ 07444

Utility, January '84.

You can create your own character sets for the Apple Dot Matrix Printer.

The Graphics Magician

★★★★★

Penguin Software, 830 4th Avenue, Geneva, IL 60134

Graphics, June '84.

A great graphics utility for the Apple. No wonder so many professional game designers use it.

Graph 'n' Calc

★★★★★

Desktop Computer Software, Inc., 303 Potrero Street, Santa Cruz, CA 95060

Business graphics, March '84. Chart your way to the top with this graphics package for the Apple ///.

Gruds in Space

★★★★★

Sirius Software, Inc., 10364 Rockingham Drive, Sacramento, CA 95827

Adventure game, June '84.

Saving the universe can be a chore. A game where all is not what it seems.

by Bob Ryan

Gutenberg Jr.

★★★

Micromation Limited, 1 Yorkdale Road, STE 406, Toronto, Ontario, M6A 3A1

Word processor, June '84.

A powerful and inexpensive program for combining text and graphics. Limited in the hardware it supports.

Hands On BASIC Programming

★★★

Peachtree Software, Inc., 3445 Peachtree Road N.E., Atlanta, GA 30326

Education, January '84.

A package that makes learning to program in BASIC a lot easier.

Image Printer

★★★

Sensible Software, 6619 Perham Drive, West Bloomfield, MI 48033

Graphics, January '84.

Dump your Apple graphics to your printer with this utility.

Incredible Jack

★★★

Business Solutions, Inc., 60 E. Main Street, Kings Park, NY 11754

Business, January '84.

The first integrated software for the Apple. It suffers from speed problems, but stay tuned for Jack2.

In Search of the Most Amazing Thing

★★★

Spinnaker Software, 215 First Street, Cambridge, MA 02142

Education, June '84.
An adventure game for children that helps develop reasoning skills and which de-emphasizes violence.

IQ Baseball

★★★

Davka Corporation, 845 North Michigan Avenue, Chicago, IL 60611

Strategy game, May '84.

Baseball trivia fans will eat this one up. So who was the only pitcher to appear in 1000 games?

Kids Corner: Learning About Numbers

★★★

C & C Software, 5713 Kentford Circle, Wichita, KS 67220

Education, January '84.

Not just another math drill program. Kids enjoy this learning experience.

Lancaster

★★★

Silicon Valley Systems, 1625 El Camino Real, Belmont, CA 94002

Arcade game, April '84.

Bubble blowing space bugs threaten the Earth!!! You are humanity's only hope!!! Oh well, better luck next time.

Legacy of Llylgamyn

★★★

Sir-tech Software, Inc., 6 Main Street, Ogdensburg, NY 13699

Adventure game, January '84.

The third Wizardry scenario is a wonderful creation in its own right. Are you ready for L'kbreth?

Legionnaire

★★★

Microcomputer Games, Inc., 4517 Hartford Road, Baltimore, MD 21214

Strategy game, March '84.

1 came, 1 booted, 1 played. Luckily, Brutus doesn't make an appearance when you become Caesar and take on the barbarian hordes.

Loan Amortization

★★★

Recom Data Company, 5930 146th Place S.E., Bellevue, WA 98006

Personal finance, January '84.

An easy to use package that makes borrowing decisions less taxing.

Loan Analyzer

★★★

Simple Soft, Inc., 480 Eagle Drive, Suite 101, Elk Grove, IL 60007

Personal finance, January '84.

Three VisiCalc templates help you figure out if you can afford to go into hock.

Lode Runner

★★★

Broderbund Software, 17 Paul Drive, San Rafael, CA 94903

Arcade game, April '84.

You hated them in Star Blazer, you loathed them in Choplifter. Well, the Bunglings are back! Apple Panic was never this much fun.

Magic Memory

★★★

Artsci, Inc., 5547 Satsuma Avenue, North Hollywood, CA 91601

Data base, June '84.

Put your address book on your computer with this easy to use package. Although not very powerful, it does its job well.

Market Illustrator

★★★

N2 Computing, 5318 Forest Ridge Road, Silverton, OR 97381

Business graphics, January '84.

This financial planning utility lets you chart the progress of your investments.

Micro-Math

★★★

Hayden Software, 600 Suffolk Street, Lowell, MA 01853

Education, April '84.

Four basic math packages for ages 4-10. Good graphics and color.

Microscopic Journey

★★★

Hayden Software, 600 Suffolk Street, Lowell, MA 01853

Arcade game, February '84.

Not a small rock group, but a computer game that lets you play doctor.

Microzine

★★★

Scholastic Wizware, 730 Broadway, New York, NY 10003

Education, June '84.

A disk magazine from the publishers of Scholastic. More fun than flipping pages.

Neuromuscular Concepts

★★★

Biosource Software, 2105 S. Franklin, Suite B, Kirksville, MO 63501

Education, February '84.

Everything you ever wanted to know about muscle contraction. Helpful for students.

North Atlantic '86

★★★

Strategic Simulations, Inc., 883 Stierlin Road, Building A-200, Mountain View, CA 94043

Strategy game, March '84.

An excellent simulation of a hypothetical Soviet-NATO naval confrontation. For serious war-gamers only.

OPVAL

★★★

Calshop, Inc., Box 1231, West Caldwell, NJ 07007

Personal finance, May '84.

Make a killing in the market with this option analysis program.

PeachCalc

★★★

Peachtree Software, Inc., 3445 Peachtree Road N.E., Atlanta, GA 30326

Spreadsheet, February '84.

A powerful spreadsheet with features not found in VisiCalc. For CPM equipped Apples only.

Pen-Pal

★★★

Howard W. Sams and Company, 4300 W. 62nd Street, Indianapolis, IN 46202

Word processor, April '84.

Inexpensive, and designed for basic letter writing. Easy to learn but not too powerful.

Pentapus

★★★

Turning Point Software, 11A Main Street, Watertown, MA 02172

Arcade game, April '84.

If you're sick and tired of being kicked around by multi-appendaged aliens, then this game is for you.

Personal Health

★ ★

RAM Resources, Inc., 100 Lynn Street, Peabody, MA 01960

Home health, February '84.

You can have information on health problems and medical emergencies at your fingertips.

PFS:Write

★ ★ ★

Software Publishing Corporation, 2021 Landings Drive, Mountain View, CA 94043

Word processor, April '84.

(Fermentations)

Easy to use, and with most of the functions you need in a word processor. A great value.

Piracy Proof

★ ★ ★

Kane Computing, 184 Pine Brook Boulevard, New Rochelle, NY 10804

Utility, March '84.

No one will ever come up with a foolproof software protection scheme, but Kane Computing comes close.

Planetmaster

★ ★

Magnetic Harvest, P.O. Box 255, Hopkins, SC 29061

Strategy game, January '84. You can be zookeeper for the galaxy with this challenging ecological simulation game.

Plasmania

★ ★

Sirius Software, 10364 Rockingham Drive, Sacramento, CA 95827

Arcade game, March '84.

Ready for a Fantastic Voyage? Here is a real inside look into vascular surgery.

Police Artist

★ ★

Sir-Tech Software, Inc., 6 Main Street, Ogdensburg, NY 13669

Education, January '84.

Kids get a lot of memory training, and have a lot of fun to boot, with this game for ages 7 and up.

Portfolio

★ ★

Flexible Software, 134-10 Ivy Drive, Charlottesville, VA 22901

Strategy game, May '84.

So you don't have the money to invest in the market? The thrill of investing without the risk.

The Prime Plotter

★ ★ ★

PrimeSoft Corporation, P.O. Box 40, Cabin John, MD 20818

Graphics, January '84.

Although not the easiest package to use, it is a powerful graphics utility.

Sammy Lightfoot

★ ★

Sierra On-Line, Inc., Sierra On-Line Building, Coarsegold, CA 93614

Arcade game, March '84.

A fun game featuring the ups and downs of the circus life. Oh, those daring young men...

Speed Reader II

★ ★

Davidson & Associates, 6069 Groveoak Place, #12, Rancho Palos Verdes, CA 90274

Education, June '84.

Increased productivity is the goal of this software. A good alternative to expensive speed reading courses.

Stellar 7

★ ★ ★

Software Entertainment Co., 537 Willamette, Eugene, OR 97401

Arcade game, April '84.

Beautiful 3-D graphics and plenty of action make this hunt for the evil emperor Gir Draxon an instant classic.

Telefinder

★ ★ ★

Teleware

Communications, March '84.

A specialized package that automatically pulls quotes from the Dow Jones News/Retrieval Service.

Term Exec 1.2

★ ★ ★

Exec Software, 201 Waltham Street, Lexington, MA 02173

Communications, June '84.

A sophisticated yet low cost communications package for the Apple. Sometimes hard to use, but worth the bother.

Think Tank

★ ★ ★

Living Videotext, Palo Alto, CA

Idea processor, April '84.

Not just a word processor, this program will help keep your thoughts straight.

Troll's Tale

★ ★

Sierra On-Line, Inc., Sierra On-Line Building, Coarsegold, CA 93614

Adventure game, March '84.

A game for children 9 and over. What kid doesn't want the chance to become an Honorary Dwarf?

Tycoon

★ ★

Blue Chip Software, 6744 Eton Avenue, Canoga Park, CA 91303

Strategy game, April '84.

A realistic commodity market simulation game. Money doesn't grow on trees, but in soybean fields.

The Witness

★ ★ ★

Infocom, Inc., 55 Wheeler Street, Cambridge, MA 02138

Text adventure, March '84.

This game is good, sweet-heart. It's very, very good. Be sure to play it again, Sam.

Write Away

★ ★ ★

Midwest Software Associates, 1160 Appleseed Lane, St. Louis, MO 63132

Word processor, March '84.

A powerful and complete word processor. And it's fast.

Young Folks Series

★ ★

Island Software, Box 300, Dept. E-16, Lake Grove, NY 11755

Education, January '84.

Software that helps young children learn spatial concepts, letter discrimination, and quantitative concepts.

Zoom Graphics

★ ★

Phoenix Software, 64 Lake Zurich Drive, Lake Zurich, IL 60047

Graphics, January '84.

A printer dump utility that lets you get a hard copy of your graphic creations.

Hardware

Amdisk-I Microfloppy

★ ★ ★

Amdek Corporation, 2201 Lively Boulevard, Elk Grove Village, IL 60007

Disk drive, May '84.

An excellent second drive for the Apple. And it won't take up a lot of room on your desk.

Color Plotter

★ ★

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014

Plotter, May '84.

A four-pen plotter for making charts and graphs. Hampered by a lack of software support.

EXP 500

★ ★

Silver-Reed America, Inc., 19600 S. Vermont Avenue, Torrance, CA 90502

Printer, June '84.

A daisy-wheel printer with 12 cps and a low price tag. Free yourself from dot-matrix.

E-Z Card

★ ★

Orbital Systems, 2929 E. Jasmine, Mesa, AZ 85203

Coprocessor, January '84.

A Z-80 card that you put together yourself. It comes without software. Strictly for advanced users.

Juki 6100

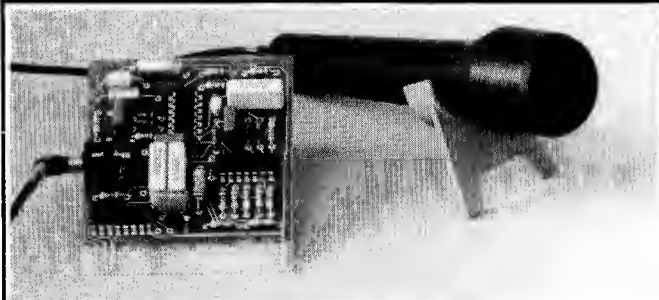
★ ★ ★

Juki Industries of America, Inc., 299 Market Street, Saddle Brook, NJ 07662

Printer, June '84.

A low-cost daisy-wheel printer that features 18 cps operation.

NEW! TALK TO YOUR APPLE



VOICE INPUT THAT WORKS. \$199

Imagine being able to enter data and commands into your Apple by talking to it! Up until now, speech recognition peripherals were either too expensive or did not work well enough to be useful. The Microsignal SR-32 speech recognizer is changing all that. First it is priced reasonably at \$199. Second, it works. Performance is equal or better to units costing thousands of dollars. Third, it is easy to use.

Your vocabulary can have up to 32 words (or short phrases) of your choice. More are possible by paging two or more vocabularies. You train the SR-32 to your voice by saying each word in the vocabulary three times. That's all. Then, by using our PARKEY program you can enter data by either talking or typing. The Apple wouldn't know the difference. Or you can add voice input to your programs—a line of BASIC is all that is needed to recognize a word. Vocabularies can be saved on disk and recalled when needed.

Use your SR-32 to enter data to your spreadsheet. Or to control your word processor. Or just for fun and games. Or you may want to experiment with robotics. And there must be many creative ways to use voice input nobody has thought of yet.

The SR-32 comes complete with hardware that plugs into a slot of your Apple II+ (48K) or IIe, microphone, diskette with software and user manual. And it has a one year warranty against manufacturing defects.

To order the SR-32 send us a check for \$199. We pay shipping in the US. Foreign orders welcome, add \$20 for shipping.

microsignal

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MILLWOOD, NY 10546

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A P P L E E X T R A C T

Keywiz VIP

★★

Creative Computer Peripherals, Inc., Aztec Environmental Center, 1044 Lacey Road, Forked River, NJ 08731

Keyboard, February '84.

A keyboard enhancer with up to 248 user-programmable keys. A touch typist won't need it but it could be a lifesaver for people who have to hunt 'n' peck.

Koala Pad

★★

Koala Technologies, 4962 El Camino Real, Suite 125, Los Altos, CA 94022

Graphics, May '84.

A low cost alternative to expensive graphics tablets. Comes with software to help you create your own graphic wonders.

L-1000

★★

Smith-Corona Consumer Products, 65 Locust Street, New Canaan, CT 06840

Printer, June '84.

Letter quality can be within your budget. This inexpensive daisy-wheel printer features 12 cps operation.

Letter Quality Printer

★★★

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014

Printer, January '84.

This daisy-wheel printer features 40 cps print speed and trouble free operation. It needs more complete documentation and perhaps a lower price.

Mac Inker

★★

SAS Industries, 3091 N. Bay Drive, North Bend, OR 97459

Printer accessory, January '84.
Lets you re-ink old printer ribbons. Minor problems don't outweigh Mac Inker's economic advantages.

Microline 93

★★★

Okidata, 532 Fellowship Road, Mount Laurel, NJ 08054

Printer, February '84.

Dot-matrix printer rated at 160 cps. Also features an excellent correspondence mode at 40 cps. A quality printer.

Riteman Printer

★★

Inforunner, 1621 Stanford Street, Santa Monica, CA 90404

Printer, May '84.

A low-cost dot-matrix printer. It doesn't have all of the features of a more expensive printer, but it doesn't have a huge price tag, either.

UDS 212A/D Modem

★★

Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805

Modem, March '84.

A 300/1200 baud modem that should satisfy all of your communications needs. Works with most Apple communications software.

V1200

★★

Vista Computer, 1317 Edinger, Santa Ana, CA 92705

Disk drive, April '84.

Up to 6 megabytes of on-line storage for DOS, CP/M, and Pascal. No great speed improvement over standard floppies but back-up is easier than with hard disks.

Voice-Based Learning System

★★

Scott Instruments Corporation, 1111 Willow Springs Drive, Denton, TX 76205

Education, June '84.

A hardware-software that lets you create interactive tutorials that recognize speech input. A system with a lot of potential.

GRAPHICS TIPS DISK

INCLUDES:

- ☐ Sketching Programs.
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Good quality 5¼" single sided single density with hub rings.

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For those who want cadillac quality we have the Loran Floppy Disk. Used by professionals because they can rely on Loran Disks to store important data and programs without fear of loss! Each Loran disk is 100% certified (an exclusive process) plus each disk carries an exclusive FREE REPLACEMENT LIFETIME WARRANTY. With Loran disks you can have the peace of mind without the frustration of program loss after hours spent in program development.

100% CERTIFICATION TEST

Some floppy disk manufacturers only sample test on a batch basis the disks they sell, and then claim they are certified. Each Loran disk is individually checked so you will never experience data or program loss during your lifetime!

FREE REPLACEMENT LIFETIME WARRANTY

We are so sure of Loran Disks that we give you a free replacement warranty against failure to perform due to faulty materials or workmanship for as long as you own your Loran disk.

AUTOMATIC DUST REMOVER

Just like a record needle, disk drive heads must travel hundreds of miles over disk surfaces. Unlike other floppy disks the Loran smooth surface finish saves disk drive head wear during the life of the disk. (A rough surface will grind your disk drive head like sandpaper). The lint free automatic CLEANING LINER makes sure the disk-killers (dust & dirt) are being constantly cleaned while the disk is being operated. PLUS the Loran Disk has the highest probability rate of any other disk in the industry for storing and retaining data without loss for the life of the disk.

Loran is definitely the Cadillac disk in the world

Just to prove it even further, we are offering these super LOW INTRODUCTORY PRICES.

List \$4.99 ea. INTRODUCTORY SALE PRICE \$2.99 ea. (Box of 10 only) Total price \$29.90
\$3.33 ea. (3 quantity) Total price \$9.99

All disks come with hub rings and sleeves in an attractive package.

DISK DRIVE CLEANER \$19.95

Everyone needs a disk drive doctor

FACTS

- 60% of all drive downtime is directly related to poorly maintained drives.
- Drives should be cleaned each week regardless of use.
- Drives are sensitive to smoke, dust and all micro particles.
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The Cheetah disk drive cleaner can be used with single or double sided 5¼" disk drives. The Cheetah is an easy to use fast method of maintaining efficient floppy diskette drive operation.

The Cheetah cleaner comes with 2 disks and is packed in a protective plastic folder to prevent contamination.

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- ***15 Day Free Trial - 90 Day Immediate Replacement Warranty***

9" Screen - Green Text Display	\$ 69.00
12" Screen - Green Text Display (anti-reflective screen)	\$ 99.00
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12" Screen-Super 1000 Line Amber Text Display	\$129.00
14" Screen - Color Monitor (national brand)	\$249.00

Display Monitors From Sanyo

With the need for computing power growing every day, Sanyo has stepped in to meet the demand with a whole new line of low cost, high quality data monitors. Designed for commercial and personal computer use. All models come with an array of features, including up-front brightness and contrast controls. The capacity 5 × 7 dot characters as the input is 24 lines of characters with up to 80 characters per line.

Equally important, all are built with Sanyo's commitment to technological excellence. In the world of Audio/Video, Sanyo is synonymous with reliability and performance. And Sanyo quality is reflected in our reputation. Unlike some suppliers, Sanyo designs, manufactures and tests virtually all the parts that go into our products, from cameras to stereos. That's an assurance not everybody can give you!



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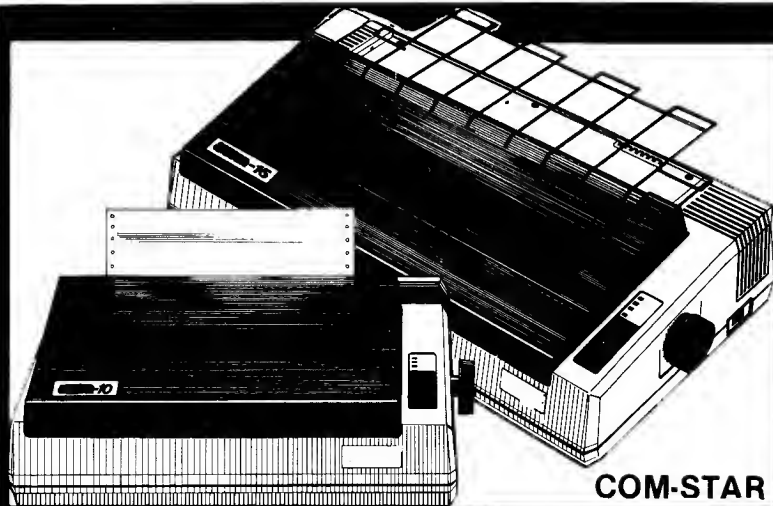
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*STX-80 COLUMN PRINTER—\$149.00

Prints full 80 columns. Super silent operation, 60 CPS, prints Hi-resolution graphics and block graphics, expanded character set, exceptionally clear characters, fantastic print quality, uses inexpensive thermal paper! Best thermal printer in the U.S.A.! (Centronics Parallel Interface).

**DELUXE COMSTAR T/F 80 CPS PRINTER—\$179.00

The COMSTAR T/F (Tractor Friction) PRINTER is exceptionally versatile. It prints 8½" x 11" standard size single sheet stationary or continuous feed computer paper. Bi-directional, impact dot matrix, 80 CPS, 224 characters. (Centronics Parallel Interface).

Premium Quality—120 CPS COMSTAR T/F SUPER-10X PRINTER—\$289.00

COMSTAR T/F (Tractor Friction) SUPER-10X PRINTER gives you all the features of the COMSTAR T/F PRINTER plus a 10" carriage, 120 CPS, 9 x 9 dot matrix with double strike capability for 18 x 18 dot matrix (near letter quality), high resolution bit image (120 x 144 dot matrix), underlining, back spacing, left and right margin settings, true lower decenders with super and subscripts, prints standard, italic, block graphics

and special characters, plus 2K of user definable characters! The COMSTAR T/F SUPER-10X PRINTER was Rated No. 1 by "Popular Science Magazine." It gives you print quality and features found on printers costing twice as much!! (Centronics Parallel Interface) (Better than Epson FX 80).

Premium Quality—120 CPS COMSTAR T/F SUPER-15½" PRINTER—\$379.00

COMSTAR T/F SUPER 15½" PRINTER has all the features of the COMSTAR T/F SUPER-10X PRINTER plus a 15½" carriage and more powerful electronics components to handle large ledger business forms! (Better than Epson FX 100).

Superior Quality SUPER HIGH SPEED—160 CPS COMSTAR T/F 10" PRINTER—\$399.00

SUPER HIGH SPEED COMSTAR T/F (Tractor Friction) PRINTER has all the features of the COMSTAR SUPER-10X PRINTER plus SUPER HIGH SPEED PRINTING—160 CPS, 100% duty cycle, 8K buffer, diverse character fonts, special symbols and true decenders, vertical and horizontal tabs. RED HOT BUSINESS PRINTER at an unbelievable low price!! (Serial or Centronics Parallel Interface)

Superior Quality SUPER HIGH SPEED—160 CPS COMSTAR T/F 15½" PRINTER—\$529.00

SUPER HIGH SPEED COMSTAR T/F 15½" PRINTER has all the features of the SUPER HIGH SPEED COMSTAR T/F 10" PRINTER plus a 15½" carriage and more powerful electronics to handle larger ledger business forms! Exclusive bottom paper feed!!

PARALLEL INTERFACES For VIC-20 and COM-64—\$69.00 For Apple Computers—\$79.00

NOTE: Other printer Interfaces are available at computer stores!

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We have doubled the normal 90 day warranty to 180 days. Therefore if your printer fails within "180 days" from the date of purchase you simply send your printer to us via United Parcel Service, prepaid. We will IMMEDIATELY send you a replacement printer at no charge, prepaid. This warranty, once again, proves that WE LOVE OUR CUSTOMERS!

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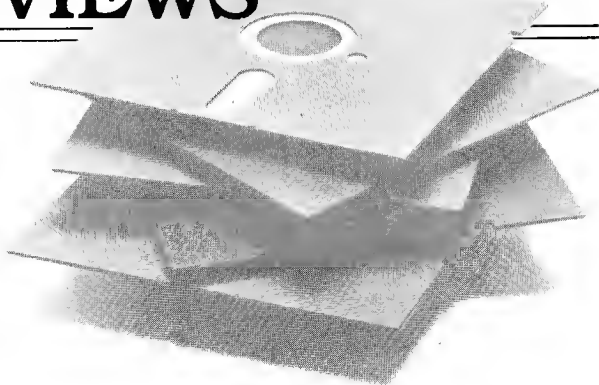
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SOFTWARE REVIEWS



The Eating Machine

Is your diet properly balanced? Do the foods you eat contain the nutrients necessary for good health? I was reluctant to answer these questions, simply because I never conducted a thorough analysis of my eating habits. Then a practical, informative Apple program called The Eating Machine introduced the importance of planning my diet.

The Eating Machine is designed for healthful diet management. At breakfast, lunch, dinner, and snacks, the user chooses from a conveniently organized data base of 500 foods. The program compares your selected diet to the recommendations of health authorities, and presents this comparison in a descriptive report as well as in lively color graphics charts.

The program first asks for your age and sex to establish your broad range daily calorie goal. For instance, a 20-year-old male is assigned a daily requirement of 2500 to 3300 calories per day. The program presents a menu that allows you to add or delete foods from the meal, jump to another meal, or examine the day's scores.

If you choose to add foods to breakfast, the program presents another menu of 11 food types, including dairy products, grain products, fruits, fats and oils, vegetables, and fast foods. Suppose you want to choose a glass of whole milk as part of your breakfast. Using the arrow keys, you would move the cursor to the line entitled "Dairy Products & Eggs" and press Y for "yes." Then you would be given an additional, extensive menu of foods in that category. You would scroll through the given foods, locate "Milk, Whole," and press Y again. You would then be presented with the typical serving of whole milk (one cup) and be asked whether you would like to add that size serving, half that serving, or twice that serving to breakfast. You could also choose to abort the food selection or examine its particular nutritional scores. Finally, you would return to the original menu.

The food selection process is organized and easy to learn. The uncluttered, succinct menus allow you to enter an entire day's meals in less than five minutes. The "Mixed Dishes" food category, which enables you to choose a single item such as beef stew without specifying every ingredient in the dish, is a time-saving

feature. Another virtue is that the program enables you to supplement its food data base with 200 more foods.

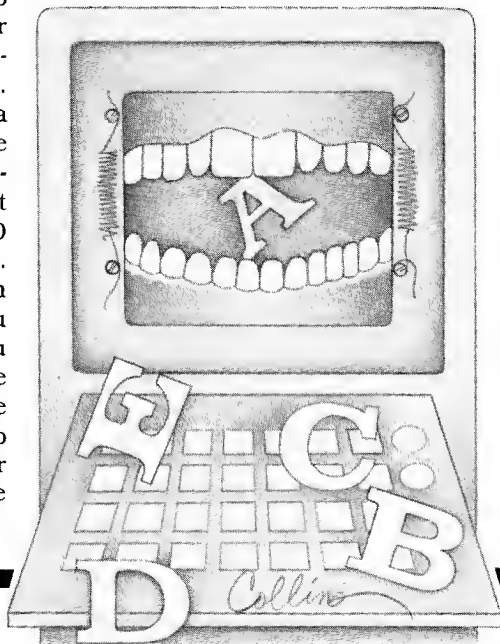
The Eating Machine displays four sets of bar graphs to explain the nutritional values of the foods you eat. Half of each display consists of the actual graph, while the other half shows a curious fellow in a blue and white striped shirt who smiles and frowns as the nutritional values of your foods are compared to the United States Recommended Daily Allowances.

The first bar graph compares your calorie total to your goal. The second display indicates the calorie percentages that originated from protein, carbohydrate, fat, and alcohol. Bar graph three shows the amounts of protein, vitamin A, and vitamin C contained in the foods of your plan, and graph four shows the amounts of calcium, iron, and sodium.

In addition to the bar graphs, the program provides a textual evaluation of the required nutrient amounts in your diet. If you fail to meet a requirement, the program suggests foods that contain the needed nutrients.

The analysis is presented in a lively format. The striped-shirted fellow is a welcome addition to the colorful and easy-to-read bar graphs. Furthermore, your diet's nutrient evaluation is written in a friendly tone.

The comprehensive, 60-page instruction manual suggests that by comparing the nutritional contents of different foods, you can formulate a nutritionally balanced diet. The purpose of the program, as emphasized in the documentation, is not to



determine your ideal weight but to aid you in developing eating habits that satisfy nutritional requirements.

The Eating Machine is an eye-opening tool for planning your diet. This program stands far above typical personal aid utilities. The Eating Machine is the best diet planning program that I have ever seen on the Apple. It is available for \$49.95 from Muse Software, 347 North Charles Street Baltimore, MD 21201. ■

Steven Williams
Chester, NJ

VODAC—The Alpine Encounter

Nestled in the Swiss Alps lies a picturesque luxury resort. A tram car takes skiers to the top of a craggy peak; guests feast on gourmet food in the restaurant, relax in the sauna or plush lounge, and dance in the ballroom.

This hardly seems the setting for adventure, but the Alpenhof Ski Resort is actually a hot spot of intrigue crawling with spies, secret agents, and beautiful women who hold the pieces of a puzzle which, when solved, will thwart a deadly international plot.

That's the setting for VODAC—The Alpine Encounter, an illustrated adventure game by Ibidinc. The action begins with a telegram from the Chief of VODAC Task Forces directing you to Alpenhof to intercept and stop the agents of VODAC in their latest scheme to control the world.

VODAC's plot has something to do with the theft of a priceless Ming vase from the Imperial Museum in Peking and stolen plans for an invulnerable U.S. ballistic missile. The VODAC task force suspects the events are re-

lated and that the stolen items are at the Alpenhof.

To explore the resort and solve the mystery, you'll have to master a basic set of commands that move you around the hotel, enable you to examine rooms and articles, and interview witnesses and suspects. Some of these commands include LOOK, which tells you about objects not appearing in the illustrations; N, S, E, and W, which move you in the cardinal compass directions; TAKE, OPEN, GO, ASK, GIVE, and PUT.

Keep pencil and paper handy to make a map and to list clues and names as you run across them. The map is important because there are 93 locations in the game you'll have to explore before you can solve it. With 28 characters and scores of clues, a written record of your activities is vital. Remember, you're never going to run across the same name or clues twice. Covering the same ground too often wastes precious time.



Be prepared to encounter numerous death traps during your mission. Have an initialized scratch disk handy so you can save your position before you do anything risky, and restore the game in case you die. If you want to record clues, but

hate pencil and paper work, the command PRINTER will dump the text to your printer, saving you some trouble and giving you a chance to study the game away from the computer.

If the strain is too much, you can always go skiing. Buy a tram pass at the Ski Shop, rent some skis, and head for the mountain. With keyboard or joystick controls, guide your hero down novice or expert slopes. The novice slope is easy to master and a good place to learn how to dodge trees. Your arcade skills will be put to a stiffer test on the expert slope.

The game system responds a little slowly to commands sometimes (a

pause of three or four seconds). This delay may be due to the game's interactive nature. According to the player's manual, the clues you collect and the people you encounter can change the scenario. If that's the case, it will take an extra second or two for the disk drive to load new data into memory if you've changed the story. Other than the occasional delays, there's nothing in the game system to complain about; it's very much like other popular adventures.

Using the Penguin Graphics Magician, author Carol Anderson designed handsome high-resolution color graphics that capture the atmosphere of a Swiss resort. They aren't the most polished graphics, but they are several cuts above some of the crude work seen elsewhere. The game packaging is sturdy, attractive, and professional looking.

VODAC—The Alpine Encounter is available for \$39.95 from Ibidinc, 179 Allyn Street, Suite 607, Hartford, CT 06103. The game will run on a 48K Apple II Plus or Apple IIe. A paddle or joystick control is optional for the arcade skiing game. ■

Brian J. Murphy
Fairfield, CT

The Writer

Perhaps the best justification for owning a personal computer is its use as a word processor. This may explain the proliferation of word processing software packages. Since these packages contain different features and carry varying price tags, the consumer is faced with a sometimes bewildering array of alternatives. You'll have to add one more to your list of serious considerations, however.

The Writer, by Hayden, is based on the successful Pie Writer, a more complete and more expensive word processor. The Writer contains most of the strong points found in its predecessor. It provides an 80-column display if an 80-column board is present. It even allows for up to 127 character lines when used with an 80-column board.

An on-screen help menu is

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"The program practically configures itself."

available, but it can be removed to allow increased text display when you no longer need the assistance. The Writer will use a lowercase chip with 40-column displays, and has mail merge capability for preparing form letters. There are separate versions that take advantage of the unique keyboard features on the II Plus and IIe.

Ease of Use

The program practically configures itself. After making a standard DOS 3.3 copy of the original, you boot-up the copy. The Writer identifies your equipment (II Plus versus IIe, amount of memory, or 80-column hardware) and asks for your verification. A few other questions that require your input include answering a question about the presence of a lowercase chip or the shift-key modification. After a few minutes, you have a ready-to-go version of The Writer. You can modify most of the editor and print out options via a configure program, although I did not find this necessary.

Text can be entered so that it overwrites previous material or is inserted in between existing text. You have the option of "wrapping" the text around from one line to the next as you enter it, permitting you to keep typing and disregard the cursor position. In the wrap mode, a word that will not fit on one line is automatically moved to the next line (à la Screenwriter II or the Pascal Editor).

There are handy control keys for jumping to and moving between the upper left or lower left corners, or from the left to the right side of a line. You can move down or up one full screen of text, or shift the material up or down a line while keeping the cursor at its current position.

It took me a while to figure out one aspect of text entry. When you want to embed new text within existing material, you enter the insert mode by typing control-P. As you type, the

old text is pushed off screen to the right, creating a "long line" that can hold only another 40 characters. (The Writer will not "wrap" beyond the 128 character limit.) To embed more than 40 characters, you can issue an escape control-I that cuts the line and places the old text on the next line.

In "cutting," be careful not to have your cursor on a blank space. (It should be on the first non-blank character to be shifted to the right.) The Writer interprets a line starting with a blank as a request for a line break. This results in incorrect formatting at printing time.

Printing Options

The Writer provides most of the more useful print options. These are entered as two letter commands preceded by a period and occasionally followed by a numeric argument. The commands allow for setting up paragraph indentation, justification, vertical or horizontal layouts, headers or footers, form letter operation and various features such as centering, underlining, or boldfacing text.

Documentation

The documentation consists of a 127-page manual, two reference cards (one for the II Plus and one for the IIe), and several introductory files. The manual is well written, and contains a table of contents and an index. A reference section for each version aids in locating specific subjects.

Limitations

While I found The Writer to be a complete and useful word processor, you should know that it doesn't offer features found on more expensive programs. The Writer does print subscripts or superscripts by sending control codes. It does not have the ability to define macros—multi-key key stroke sequences triggered by one or two strokes. Each document is limited to the size of available memory, which on my II Plus was about five and one half pages. The Writer does, however, chain documents together at print time, thus allowing you to prepare longer material.

Many word processing packages

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let you read or write both text and binary files. This option accesses files created by other programs. For example, you might convert an AppleSoft program to a text file in order to edit it with your word processor. There is one caveat, however. The Writer has an input buffer of 128 characters (the maximum line length). When you try to read files with longer lines (more than 128 characters between carriage returns), it hangs. I tried reading both Screenwriter II (text) and Apple Writer II (binary) files. You can circumvent this problem by outputting formatted material from either one of these programs to a text file. The formatting process will enter carriage returns at the end of every line, making the text readable by The Writer.

The Writer's manual indicates how to set tab positions forward or backward. The tab keys (control-A and control-G) work in one of two ways depending on whether the program is in wrap or no-wrap mode. They act as tab keys in no-wrap, and as such jump ahead or back one word when in wrap. The reference section explains that "word tabbing is always enabled in wrap mode, while column tabbing is in effect when in manual mode." Columnar information is not entered in wrap mode, and therefore, a columnar tabbing in wrap is not provided.

Hayden borrowed from its more powerful word processor, Pie Writer, most of the features needed for everyday work. The Writer, a low-

cost word processing option, may be the word processor you need for general text entry, and edit or mail list operation. The Writer is available from Hayden Software, 600 Suffolk Street, Lowell, MA 01853. Price is \$49.95. ■

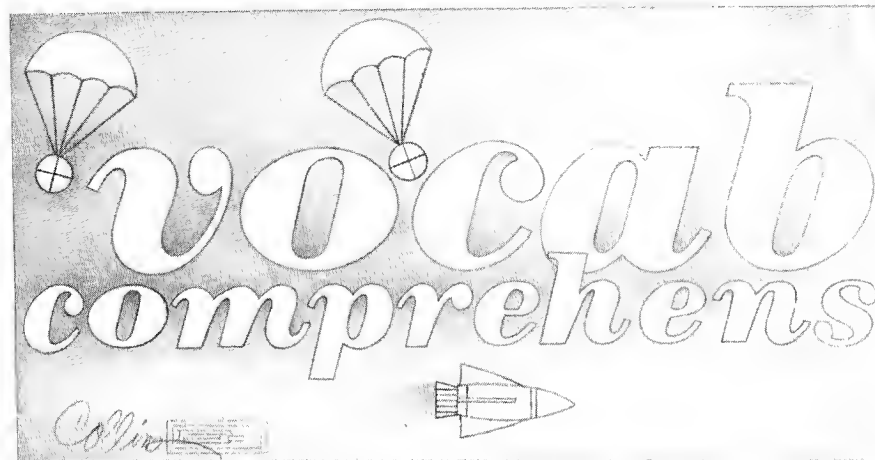
David Morganstein
Germantown, MD

Word Blaster

Word Blaster makes learning to read more fun. What student would balk at practicing vocabulary skills when drills are combined with a chance to shoot rockets and blast words right off the screen? Word Blaster, published by Random House, provides enjoyable, effective reading practice for students in grades two through six. The program, which comes on two disks, is flexible enough for older students who have reading difficulties.

The exercises are designed according to the "cloze technique." This format constructs a sentence with one word missing, and the student must choose the appropriate word from five choices in order to complete the sentence. Educators use the cloze technique frequently because it helps develop oral reading skills with comprehension and vocabulary skills.

The game begins by showing a rocket on a strip of land surrounded by mountains. A sentence with one word missing is displayed below the rocket launch pad. After reading the



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sentence and the five possible answers, the student presses the return key. This moves the five words across the screen at a selected speed. Next, the student fires the rocket at one of the words by pressing the space bar.

If the student hits the correct word, that word drops down by parachute into the blank sentence space. Play then continues with the next sentence. If the student does not hit the correct word, that word explodes and disappears from the screen. The student is given another chance before the correct answer is shown.

Word Blaster's five levels correspond with reading levels for grades two through six. Each level contains nine lessons with 12 sentences per lesson. This gives a student 108 practice sentences for each reading level. Within each level, the nine lessons are subdivided by a difficulty factor (three easy, three medium, and three hard). The student chooses the difficulty level at the beginning of the game. According to the documentation, the medium lessons are written

for the targeted grade level. The easy lessons are written one year below grade level, and the hard lessons one year above grade level.

Elementary-aged students will enjoy practicing reading skills with this program. Word Blaster comes in a version for the Apple II or //e, and the TRS-80. The program contains two disks and a comprehensive teacher's manual. It costs \$150, and is available from Random House, 201 East 50th Street, New York, NY 10022. ■

Janet M. O'Neill
Nashua, NH

Kidwriter

Ken Clarendon is a great little six-year-old who lives down the hall from me. Like a lot of kids his age, he does a fair amount of running around in his ET outfit, talking up a storm with his imaginary friend. Every now and then he runs out of steam and comes over to my place to

do something quiet like drawing a picture. He talks about his picture while he draws, and, because he knows I am a teacher, asks me to help him spell as he adds a few words "like a real storybook." He feels a little frustrated at times because his story-telling goes a lot faster than his writing. When his hand gets tired, he runs off.

I do a lot of word processing on my Apple //e and Ken likes to watch. I wondered if there were any software available that might help him and other kids who like to draw and write, but for whom handwriting is awkward and laborious. I thought about the word processors I use in school, but there is nothing really "fun" about them. Besides, I was thinking more of an educational game that could be used at home. Then I ran into Kidwriter from Spinnaker Software.

The amazing thing about Kidwriter is that you make your own pictures, then write a story to match. Here's how it works. There are 99 different pictures stored on disk—buildings,

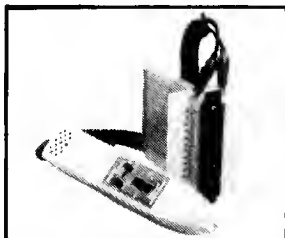
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trains, furniture, cars, spaceships, children, animals, letters, and numbers. Each picture can be big or small, done in various colors, set on different backgrounds, and positioned anywhere on the screen. You can make a brightly colored train chug along a valley of green pine trees under an inviting blue sky. Or you can create a moonscape with strange red creatures and a large blue robot. The possibilities are endless.

I brought Kidwriter home for Ken to try out. After we booted the program, he selected M to make a new drawing. After we looked at a number of pictures, he selected a snowman, positioned it, made it the largest size he could, colored it blue, and pressed D for done.

Ken was now ready to write his story, and write he did! With my help he filled up the entire writing screen of seven lines! It was a funny story about a snowman who wanted to learn how to fly and go south for the winter. Ken made a few minor corrections using the escape key to delete

letters. He controlled cursor movement with the arrow keys. It was very easy.

We then saved the picture. "Can I come back tomorrow and do some more?" he asked. "Sure," I answered. School isn't the only place where a kid can learn to write.

Kidwriter is manufactured by Spinaker Software, 215 First Street, Cambridge, MA 02142. It is sold for \$34.95. ■

**Howard Kaplan
Cambridge, MA**

The Factory

Before the so-called computer revolution, we paid lip service to the concept of teaching problem-solving skills. This curriculum area, one of the prime goals for The National Council of Teachers of Mathematics in its booklet *Agenda for the Eighties* (1980), has the most to gain since computers were intro-

duced into classrooms. The Factory is the first significant software package to address the problem-solving approach to learning.

The Factory is just that—a simulation of a factory. The student experiments with three machines and later designs the products he or she can produce with the machines. Once successful—and it's not as easy as it sounds—the student has the fun of challenging a friend to make the same product using his factory. Of course, there are many decisions to make and increasingly complex levels of difficulty, which are all user controlled. At the most complex difficulty level, the user starts with the finished product and must figure out how it is constructed.

The products are squares with a combination of one, two, or three circle or square shape punches made in specific positions on the surface, with thin or thick stripes crossing the same surface. At any point the users can stop the program, but none I watched did. They were too

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involved with problem solving.

The program starts with a simple menu:

- 1) Test A Machine
- 2) Build A Factory
- 3) Make A Product
- 4) Descriptions
- 5) End

The Factory is aimed at fourth through ninth grade students. Users need at least a second grade reading level and 10–20 minutes. It includes an adequate 14-page manual.

Students develop visual discrimination, spatial perception, logic, and problem solving with The Factory. The user must learn to work backward as well as forward on a problem in order to be successful. Also, the program helps the student recognize that there is more than one way to solve a problem.

Other age groups will enjoy using this in their homes, too, since this is a flexible piece of software capable of appealing to a younger or older audience.

The Factory, authored by Marge Kosel and Mike Fish, is available for \$39.95 from Sunburst Communications, Inc., 39 Washington Avenue, Pleasantville, NY 10570. ■

**Molly Watt
Antrim, NH**

Break the Bank Blackjack

Blackjack is the only game in Atlantic City or Las Vegas that you have the slightest chance of winning. Under casino rules the advantage swings in the house's favor (the house wins on tie counts over 21), so in order to give yourself an edge you need a system. Break the Bank Blackjack, an Apple program from Gentry Software, can help.

The program trains you to think strategically. It teaches the techniques of play and the most important of all blackjack strategies—how much to bet and when to bet it.

There are two ways to approach the game. One is to learn simple strategies for play—when to hit, when to stand, when to double, or when to split. Extensive drills cover every

combination of hands to give you the maximum possible chance, even without card counting, to win. The program quizzes you on the right play to make, and shows sample hands on the high-resolution color video display.

Card counting is another method. A point counting system offered by Break the Bank Blackjack gives you the extra edge of knowing which decisions to make and how much to bet.

The point count keeps track of the cards without remembering how many of each denomination were dealt. In its simplest form, the system assigns a point value to each of the cards. Twos through sixes are worth +1 each, seven to nine are worth 0, the tens, face cards and aces are worth -1.

You keep a running total of all the cards you've seen played. The total dealt for the next hand tells you whether or not to bet a minimal or maximum amount. If the count is positive (+), you can assume the remaining cards favor the player and you raise your bet. If the count is negative (-), you assume the remaining cards favor the house and keep your

wagers to a minimum.

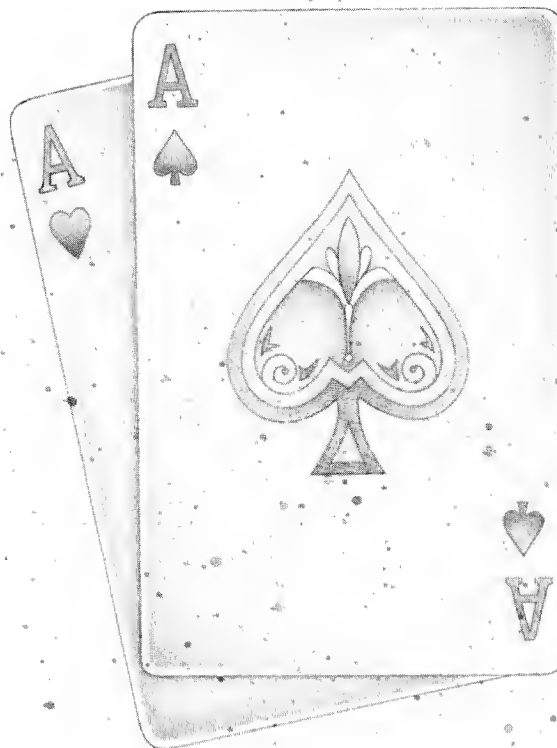
In intermediate and advanced point counting, you blend your playing and betting strategies. You learn that the correct play depends on the running count. As with the basic strategy drills, you are shown examples in the tutorial and are quizzed on them. Be patient and stick to it until you make the right wagers and plays.

In the blackjack simulation, you will play under typical Vegas rules:

- Split any pair once.
- Double down on any two cards.
- Surrender option on first two cards.
- Dealer hits on 16 and under.
- Dealer stands on 17.
- Blackjack pays 3 to 2.
- Insurance pays 2 to 1.

The game's only failing is that only your hand and the house hand are shown. It would be more realistic if the program simulated four hands, giving you a better feeling for actual casino play and a tougher counting challenge.

Before you saunter to the blackjack tables, practice this system. A couple of weekends with the computer won't do the trick. Even then, you have no



guarantee that you won't lose your shirt. Don't be too obvious that you're counting cards. If the management catches you counting cards, or only suspect it, you will be asked to leave the casino at once.

Break the Bank Blackjack is dealt by Gentry Software, 9411 Winnetka Avenue, Chatsworth, CA 91311. You can try your luck with it on any model Apple II with a disk drive. The suggested ante is \$24.95. ■

Brian J. Murphy
Fairfield, CT

Preschool Skill Builders

Is your preschooler computer literate? Although this query is not as common as those concerning walking or potty training, parents should expect to hear it more in the coming years as computers will play an increasingly significant role in their children's future.

To start them off on the right foot, Jeppers Creatures, Letters and Words, and Alphabet Beasts and Company are programs designed for preschoolers and require very little adult supervision.

Jeppers Creatures (\$34.95) by Kangaroo, Inc., 332 S. Michigan Avenue, Suite 700, Chicago, IL 60604, is a simple game where students choose a head, torso, and legs to assemble a creature. Each time the game is played, a "zoo" of ten creatures is selected from a larger den of animal characters; the students mix and match the body parts in any way imaginable. The number of possible creature combinations is 26,970!

The best feature of this program is that it not only fosters a child's artistic creativity, but it also provides practice for word recognition and sound association since the child must name the creatures, being created. Each creature, whether real or fictitious, is accompanied by its name at the bottom of the screen. Thus, real animals have their true name, but the "creatures" are tagged by a mixed breed etymology derived from the names of the animals they

were designed from. By having the students vocalize these awkward constructions, they will recognize and sound out various letter combinations.

Letters and Words (\$49.95) from Learning Well/Methods and Solutions, Inc., 200 S. Service Road, Roslyn Heights, NY 11577, provides practice and reinforcement of three early reading skills: alphabetical order sequencing, upper/lowercase association, and word/object association. Only one key, the space bar, is necessary for input to the program.

The alphabetical order game displays the alphabet scrolling across the screen until a five letter segment is selected. Then, four of the five letters are displayed in the middle of the screen, with the missing letter always being the one in the middle. Next, the computer substitutes a letter for the missing letter. The child is prompted to indicate agreement or disagreement with the computer's substitution. The menu of response choices for all three games consists of four graphic icons: a nodding "yes head," a shaking "no head," a question mark, and a waving "goodbye hand."

In the upper- and lowercase association game, capital letters are "split" into the original capital and a lowercase letter that may or may not correspond to the given capital letter. The program waits for the child to agree or disagree with the pairing via the menu "heads." In the word association game, drawings of common objects appear on the screen with a noun that may or may not correctly identify the object. Once again, the child is asked to agree or disagree with the pairing by selecting one of the menu "heads."

This program's strengths are its ease of use, effective feedback, and highly entertaining graphics. The program makes practicing these pre-reading skills fun. Another benefit is that the documentation contains ideas for non-computer, follow-up activities to reinforce the reading skills.

The Letters and Words program has minor weaknesses. The timing of the alphabet song is not quite right. It keeps track of only one child's progress through the games.

"Only one key is necessary."

And, the word/object association game possesses only three word lists of approximately 10 words each that the parent or teacher cannot change.

Alphabet Beasts and Company (\$34.95), manufactured by Reader's Digest Software, Microcomputer Software Division, Pleasantville, NY 10570, uses superb graphics to show students how to draw block printing letters and Arabic numerals. The program consists of three operating modes, letters, numerals, and creatures.

At any point in this program, the child may choose between these modes by pressing either a letter, a number, or the space bar. By pressing any letter, the program will produce a graphic picture and accompanying prosaic verse keyed to the chosen letter. If the child presses the letter a second time, the chosen letter will be drawn on the screen.

If the child wishes to view numbers, pressing a number key will spell out the word for the number on the screen. The same number key, if pressed again, draws the numeral and creates some graphic animation. A program weakness, however, is that the letters, words, and numerals are drawn too quickly and too small (approximately one-half inch).

Pressing the space bar causes a "creature feature" to appear. This mode is similar to the Jeppers Creatures program because the child can build a creature by changing heads, torsos, and legs. The difference is there are only four unnamed figures to mix and match. This lack of variation is rather boring.

With adult guidance, all of the programs can instill keyboard familiarity and provide practice in sequencing letters and numbers for children. These programs allow the preschooler to have fun while practicing selected pre-reading skills. The three programs were written for either an Apple or Apple compatible computer with one disk drive and a color monitor. ■

Michael Waugh
Statesboro, GA

Paper Graphics

Paper Graphics marks Penguin Software's entry into the print-in-field with this varied, comprehensive package. The folks who gave you all those magical graphics programs now bring you a marvelous screen dump. But this is a dump with a difference, because Penguin has added a graphics editor to let you customize a picture before printing.

The disk is unlocked; you are encouraged to copy it and use only the back-up. The programs are in AppleSoft, so you can list them and see how everything is done. All the routines can be used with your own programs. Penguin makes it easy for you to adapt their routines to your needs.

First, you need a hi-res image on page 1 or page 2. There are excellent business and graphics utilities that will do this for you. Any program that saves a screen to the disk in a DOS 3.3 format is compatible with this pro-

gram. Paper Graphics includes instructions for using its routines from Apple Logo, Dow Jones Market Analyzer, and your own programs.

After you have a hi-res screen either in memory or on disk, boot Paper Graphics. Everything is menu driven using one-key commands. Commands are logical, consistent, and easy to remember. A 23-page booklet provides complete, but overly concise, documentation. Also, I would have liked a few screen dumps to show me what to expect during the program.

When you first use Paper Graphics, set it for your particular printer and interface card. You have to do this only once, since your configuration is reported to the disk and used whenever you boot the program. It is simple to change this data for use on another system. It supports almost 100 printers, including some letter-quality printers, and about 40 interface cards. Check with your dealer to verify that your printer-interface card combination is compatible with Paper Graphics.

At the core of Paper Graphics lies a

powerful, versatile screen dump. You can view the image after loading a picture, create a mirror (or negative) image, or turn it upside down. After manipulating the image, you tell the program how to print it and control the darkness of print, direction on the page, and margins. Complete control is virtually at your fingertips, since you can print the whole screen or merely part of it. You can even enlarge the image or stretch it vertically and horizontally.

The best is yet to come. An Auto Load function lets you choose your graphics files for printing in any order. The program loads each one, prints it, and then goes to the next. You can print all of your tables, graphs, and game maps while you go make a sandwich.

The function that sets Paper Graphics apart from other printing programs is the Graphic Composer. The people at Penguin Software are graphics masters at heart, and the Composer shows off their skill in this utility for editing hi-res images be-

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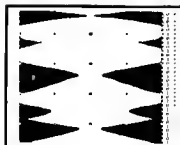
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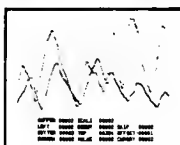
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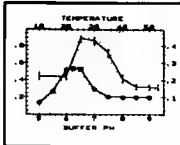
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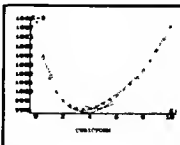


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fore printing. You can move the image around on the screen, crop out useless sections, and put boxes and frames anywhere. The Graphic Composer packs an image into fewer disk sectors. A text feature lets you put labels (in English and Greek, no less) anywhere on the screen.

Paper Graphics is for the Apple II family, DOS 3.3, 48K. The major routines are in Applesoft and can be listed. The disk is not protected and can be cataloged. It is published by Penguin Software, P.O. Box 311, Geneva, IL 60134, for \$49.95. ■

Kerry J. Lanz
inCider staff

Masquerade

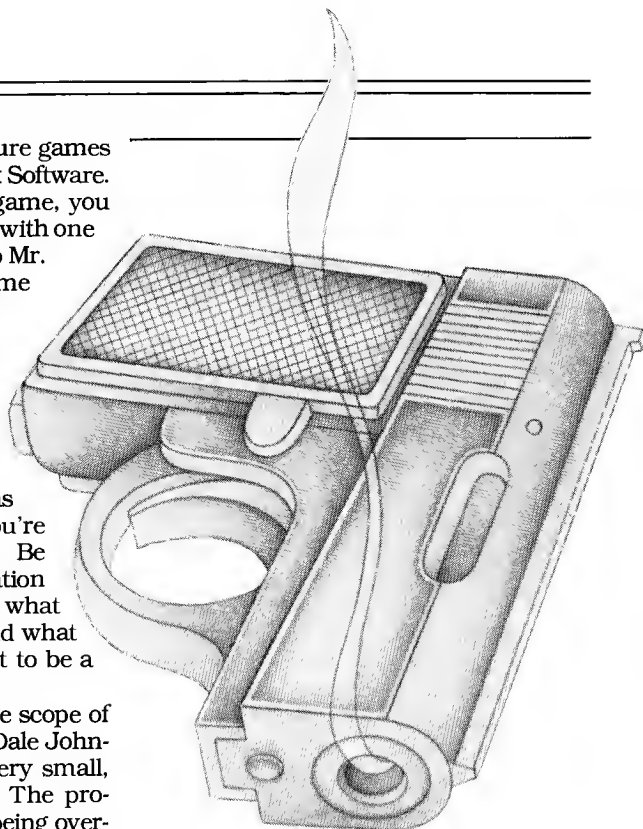
You're in a dingy run-down hotel room. A .38 Special is in your hand and at your feet, a red knot rising in his scalp, is a freshly-clobbered hitman. He's the key to cracking

one of the toughest adventure games yet, *Masquerade* by Phoenix Software.

In this richly illustrated game, you assume the role of detective with one important mission, to "Stop Mr. Topp," a mysterious crime boss. You have all the tools usually available in a game of this type, including a list of commands which may or may not be helpful (MOVE, SEARCH, TAKE, UP, DOWN, SAY, GIVE, and so on), as well as information about what you're looking at on the screen. Be sure you read that information carefully; the description of what you see is never repeated and what you read may well turn out to be a clue.

According to Phoenix, the scope of this little world, created by Dale Johnson (Sherwood Forest) is very small, about 100 locations in all. The program makes up for this by being overlaid with many puzzles which you must solve to stop Mr. Topp.

These puzzles may have more than one solution. A puzzle solution will fre-



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IC-14

quently take you quite a way along in the game—to an absolute and escape-proof dead end. A puzzle may have several solutions, but in any given situation, only one will lead you towards the stop of Topp. As you progress in the game you'll find that the individual locations become more and more puzzle-rich, which means you have to analyze the scenes more carefully as you go along. It means also that you'll have more opportunities to be stumped.

These puzzles will frequently yield you objects that you cannot use right away or in the spot you happen to be in. You will be going all the way across the landscape of the game to collect items you need or to apply the items you've found to the solutions of other puzzles. This game layers the challenges thickly on top of each other. To solve it, you'll have to be an expert level adventurer. (How do you tell if you're an expert? If you can solve all the Zork adventures without too much trouble, you're an expert.)

Rick Incrocci's excellently drawn

and witty illustrations amplify Masquerade's entertainment value with a collection of characters among the best-drawn in any computer games.

It may be too late to make the June 30, 1984 deadline for the contest (\$1000 for the solution), but even without the cash incentive, you're likely to find Masquerade a prime puzzle well worth the price of admission to solve.

Masquerade is perpetrated by Phoenix Software Inc., 64 Lake Zurich Drive, Lake Zurich, IL 60047. The game can be run on any 48K Apple II Plus or on a //e. The list price is \$34.95. ■

Brian J. Murphy
Fairfield, CT

In-The-Mail

Picture yourself sitting in front of your \$3000 word processing system with your mind totally blank. You are trying to write an im-

portant business letter, but the right words won't flow from your brain to the keyboard. You might as well have a \$29 manual typewriter on your desk, for all the good that computer is doing. Even with an impressive computer system, it isn't always easy to put thoughts on paper; we all can use some help now and then. That is what inspired In-The-Mail, a business letter generator from el Dorado Software.

In-The-Mail works with the Apple-writer word processing system to produce ready-to-send business letters from building blocks of text. You supply the heading, put in your own thoughts, and load the appropriate letter from disk.

Ninety-nine letters are on the double-sided disk, ranging from information requests to formal resignations. There is even one letter that blames a problem on your computer—the universal scapegoat. In-The-Mail also includes notes of praise, thank-you letters, and collection letters.

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The letters are short, usually only a few paragraphs, but they get right to the point. Such is the case with REF3, a "letter of refusal" that declines a charitable organization's contribution request in a diplomatic manner. By adding a few words of your own, this letter could be tailored for other situations, while remaining concise, but polite.

In-The-Mail also includes difficult-to-write letters, such as letters of criticism and expressions of sympathy. Although written with good intentions, the sympathy note is so vague it could be sent to someone who lost a loved one as well as to someone who misplaced a contact lens.

This program is well-suited for the timid person who wants to write a forceful letter and for those who could use a bit more tact in theirs. It is a good idea to skim through these letters before you send them—using the wrong letter could spell disaster. Some are so powerfully worded that

they would be difficult to retract; use them with discretion.

There are few business letters that could not originate from one or more of In-The-Mail's "boilerplates." The manufacturer covers all the bases in day-to-day correspondence. For \$60, you receive 99 different letters, a thorough user's guide and, above all, the "right words" for almost any occasion.

In-The-Mail is just the thing to make your word processor earn its keep. At an average price of 60 cents per letter, In-The-Mail is a good value that extends the usefulness of your computer system, and could save you hours previously sacrificed to "writer's block."

In-The-Mail is manufactured by el Dorado Software, 350 7th Avenue, Suite 324, San Francisco, CA 94118. It is also available for WordStar and MacWrite word processing systems. ■

Chuck Doherty
S. Dartmouth, MA

One-on-One

I admit it. Every once in a while after a hard day's work when everyone else is gone, I sit down in front of my computer and play Pac-Man, Space Invaders, Swashbuckler... I'm only human.

I usually play a particular game once or twice, quickly get bored, and move to something new. But my carefree days of jumping from one game to another are over; I'm hooked on One-on-One, starring Larry Bird and Julius Erving.

One-on-One is a basketball game manufactured by Electronic Arts and written by Eric Hammond. The game can be played with one or two joysticks; to play with two joysticks, you must use the necessary adapter. If you have only one joystick, then the defense must use the keyboard—and it isn't easy. The defensive player moves forward and backward

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The SUPER INPUT/OUTPUT board manual includes many programs for inputs and outputs. A detailed schematic is included.

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with the A and Z keys, respectively, and left and right with the left and right arrow keys.

Even with the joystick, it takes a little while to master the game. Obviously, the joystick moves the player around the court. Using the button takes some practice. Holding the button down makes the player jump; releasing it releases the ball. A quick push of the button spins your player around 180 degrees.

Vive La Difference

What makes One-on-One different from Atari's basketball game is each player's personality. Sometimes it seems like Larry Bird and Dr. J are actually inside the Apple. Hammond interviewed Bird and Dr. J and watched them in action. The results set this game apart from any I've seen.

Compared to Larry Bird, Dr. J is a step quicker, jumps higher, stretches farther and hangs in the air longer. His moves are fancier and smoother.

Larry is an outside shooter, rebounds better, and plays a more

physical game. Larry is a streak player, though Dr. J runs hot and cold himself. Part of the fun is knowing when your man is hot. If he is in a groove, go with it; if he's cold, go inside and work for a high-percentage shot or a foul.

This game is remarkably like real basketball. You can be called for traveling, reaching in, and offensive and defensive fouls. When a foul occurs, a whistle sounds and the referee makes his entrance. A 24-second clock is also in effect; no stalling allowed.

The game clock and the shot clock don't operate at the same speed. This is a real shocker the first time you discover it. According to my unofficial calculations, the shot clock expires in 20 of the game clock's seconds. The shot clock resets when you release the ball, not when the ball hits the rim. This makes it difficult to play defense, especially with the keyboard.

The Fatigue Factor

Another interesting feature is that

the game takes into account how tired the player is. Larry and Dr. J both have a bar that represents how worn out they are during the game.

As the player tires, he can't jump as high or move as quickly. The documentation says that Larry Bird insisted on this feature. The fatigue factor becomes a key in planning your strategy. You must keep your player rested. Try to pace yourself. Another way, and probably the most effective, is to let your player stand still and dribble.

The player's fatigue is crucial in longer games where you have the option of playing two, four, six, or eight minute quarters. In the longer time periods, you must use more strategy.

One of my other complaints is the way each quarter ends. Let's say I'm Larry Bird. The score is 24 to 22 with ten seconds left in the second quarter and Dr. J has the ball. He is holding for the last shot. With two seconds left he puts up a shot, it goes in and the quarter ends, making the score 26 to 22. But Dr. J also gets


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possession to begin the third quarter. If he scores, that is a four-point swing without Larry even touching the ball.

Hammond should either let the player who doesn't have last possession start the next quarter or possession should alternate as it does in professional basketball.

My final complaint is that there is no overtime. You could start a new game and play only the first quarter to determine a winner, but I think there should be an overtime built in.

Let's See It Again

If your player makes what the computer considers an outstanding move, it shows an instant replay. I can't figure out how the software knows what a great play is, but this feature really adds to the fun level of One-on-One.

I have the most fun playing against another person, but I did play against the computer a few times. There are four levels: Park and Rec, Varsity, College, and Pro.

The first level is simple; you should kill the computer. Varsity gets a little tougher, but you should still beat the computer fairly easily. The college level gets tough. It's usually a battle and can go either way. The Pro level will make your head spin. You'll think your player is moving in slow motion.

You can work up a sweat with this game, it's so realistic. One-on-One is manufactured by Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403, and sells for \$40. ■

Dan Muse
Winchendon, MA

Homeword—A Word Processor with Icons

With icon-directed software, such as that used by the Lisa, we can look forward to programs that are easier to learn and operate. Homeword, distributed by Sierra On-Line, is the first word processor for the Apple II that uses icons. It is a low-cost (\$69.95) full-featured word proces-

sor. While Homeword cannot perform functions found on more expensive programs, it is complete for letter writing and report preparation.

The package contains one copyprotected disk (a back-up is available for \$10.00), an audio cassette with written transcripts, a 30-minute tutorial, a 33-page manual, and a 4-by-8-inch reference card. Print and examine files on the disk, because they contain valuable hints not covered in the manual.

The program presents two screens. One screen contains a number of pictures (icons) along the bottom. This is a "graphic menu." To choose an option, hit the left or right arrow key to select an icon. A movable box, which borders one icon, identifies your selection. Hitting the return key causes Homeword to act on your choice.

The second screen is for edit operation. The format is similar to Screenwriter II, another On-Line product, because text appears at the top and useful information appears

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at the bottom. The top of the screen is formatted in 15 lines of 40 characters. The bottom left prints the physical page, the amount of space left in memory ("Free mem"), and the amount of space left on the disk ("Free disk"). The free space information is a horizontal line that looks like a thermometer without a scale. As free space decreases, the line shortens. According to the manual, "When the line gets very short, it means you should save everything you've written, or else the computer will be unable to hold it." Homeword holds a four- to five-page document (16 to 20 thousand characters) in memory. Later, I'll explain how to handle larger documents.

At the bottom right of the text entry screen is a novel display—a small hi-res image of the physical page with the text displayed above. The image is about 1 by 1½ inches. This is Homeword's answer to the limited 15 line by 40 character text display. It indicates a full page when printed with the current formats. The image contains dots, not letters, but gives a good indication of how the final printout will look.

Functions

In the main menu the first set of icons contains pictures of a printer (to go to a print menu), a page of text with a big X on it (to go to an edit menu), a file cabinet (to perform file manipulations), two pages of text formatted differently and connected by an arrow (to go to a layout menu), a speedometer-like image (to customize the system to your hardware configuration), and a disk (to go to a utilities menu). As you move the box bordering an icon across the screen, text appears at the very bottom to clarify what the option does.

Four new icons appear in the printer option. These are sheets of paper (to define the type of paper—continuous or single sheet), a printer (to print the document), a monitor screen (to view the formatter document in hi-res before printing), and a page with an arrow pointing to a page number (to set the starting page number). Viewing the text as it will appear is a useful option. The text scrolls up the hi-res screen to see if you need any changes in format before going to paper.

The edit screen contains six icons specifying editing functions to erase text, insert erased text, move or copy text, find or replace text.

Selecting the file cabinet from the main menu presents you with four icons: an arrow from the filing cabinet pointing to the middle of a page (insert a document in the middle of text); an open file cabinet with an arrow pointing out (get document); one with the arrow pointing in (save document), and two connected pages. Only the last icon needs explanation. Because of the limiting requirement that text must fit into memory, Homeword allows you to print several documents together by "including" them in one. You specify a location in the text, and the name of the file.

The layout menu has six icons. The first, a page with four arrows pointing to the sides, sets margin and line spacing. The second, a page with text pointing to a page without text, defines a forced page break. A third icon justifies or centers copy. Another icon indents points. The fifth icon sets the print style (regular, bold or underline). The last option defines text displayed at the top or bottom of each page for numbers or title.

Select the customize icon to establish permanent information about your configuration. You can pre-set margins, indicate the text is to be read from the second of a two drive system, select your printer interface card, or determine indent points. Oddly, the customize menu creates a back-up of a document file. This back-up option is more appropriate on the last main menu option, utilities.

The utility icons show a disk with X's (initialize a blank disk), a file cabinet with an arrow coming out and pointing to an X (erase a document), a disk with question marks (catalog a disk) and an exit sign (to leave the program).

Documentation

The documentation is not lengthy or detailed, but it is functional. The tutorial script or audio cassette will get you going. It covers every option, duplicating the screen you will see. There is an index and a three-page

listing of possible problems you will encounter.

The two-sided reference card is a helpful feature. One side contains all of the control keys needed to edit text. The second side tells you that you don't need to select icons to make the program work each icon's function. On the Apple II Plus, press shift-control and the letter to activate it, but use the open apple instead of shift-control on the //e. A text file, "Additional What Ifs," provides answers to anticipated questions.

Miscellaneous Items

The Homeword developers format their document files as standard DOS 3.3 text files, so you can use spelling check programs and interface with other programs. The manual indicates how to specify embedded information such as margins. Although Homeword generates embedded commands as underlined characters, they can be deleted just as text can. You can embed control characters for activating printer functions by preceding them with a control-X.

Homeword can't prepare form letters by merging two files, one containing your text and another the address information. It does not offer an 80-column display option for editing (it does allow you to view the text in 70-column hi-res prior to printing). Other packages allow for keyboard macros to permit multi-character sequence entries, such as commonly occurring text, with single keystrokes. Footnotes can't be positioned automatically and you can't create an index of specially identified keywords.

Impressions

The excitement over Homeword stems from the use of icons in place of the traditional text menu. Even if you know next to nothing about computers and word processing, you can enter, edit, and print text in no time. Credit goes to the icons, clearly defined options, and a streamlined program.

Contact Sierra On-Line, Coarsegold, CA 93614 for more information. ■

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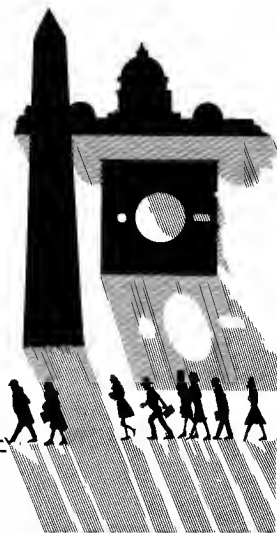
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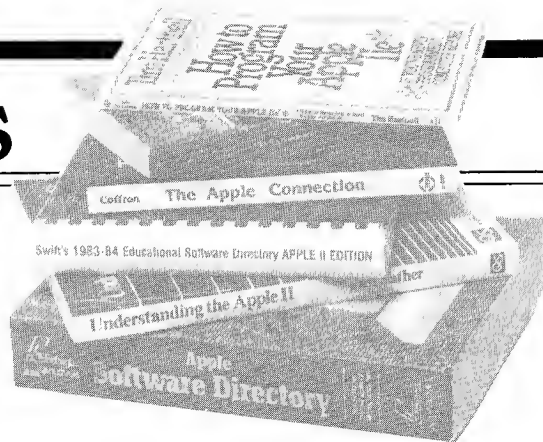
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BOOK REVIEWS



Getting the Most from Your Micro

by Ernest E. Mau

Hayden Book Company, Inc.
50 Essex Street
Rochelle Park, NJ 07662
Softcover, \$14.95

Although many think that witchcraft disappeared hundreds of years ago, computer users know differently. A computer can work flawlessly, then suddenly become possessed with heartless demons who tease, taunt, and sometimes even destroy hours or weeks of programming or data entry.

Hayden has just published a superb book by Ernest Mau, *Getting the Most from Your Micro*, to exorcise these demons. As a guide to the care and maintenance of your microcomputer, it could more aptly be titled *A Bit of Prevention Is Worth Kilobytes of Cure*. Mau has exonerated witches and demons and with expert marksmanship placed the blame where it belongs—with you and me.

Home computer systems essentially consist of a processor, a keyboard, a video display, disk drives or cassettes, perhaps a printer, and power supplies. Rather than just explaining how each of these elements works, Mau identifies why they may fail, and what you can do to prevent most failures.

With clear, easily understood sentences, he systematically offers practical tips that can take decades to learn on your own. To readers unfamiliar with computer mechanical and electrical components, he pro-

vides a bargain opportunity to acquire that familiarity.

For example, Mau recommends that your dealer run for a few days (burn in) any new equipment he sells, to eliminate “infant mortality” problems. He defines the “seven deadly hazards,” explains the mischief that “dust bunnies” cause under the keys; and emphasizes why your fingers and their support system will last longer if the fingers never wander inside a video display unit. He points out how to avoid headaches from static electricity; discusses why power surges are your responsibility and the damage they cause is not generally covered by warranty; and describes why cigarettes are hazardous to your computer’s health.

Mau stresses that you should never pinch dollars when buying disks, and details how to check the quality of a new disk, why disks should be stored vertically and not in paper sleeves, why hub reinforcements are important, and why you should always make back-ups. Then he tells you what can happen if you ignore his advice.

All this is merely the tip of the iceberg Mau has captured in his new book. In all his pages, only on page 21 did I find an error: Mau recommends that integrated circuit devices susceptible to static electricity be stored with their pins in insulating foam. In fact, conducting foam should be used. An omission that bothered me was Mau’s failure to indicate that some disk head cleaning kits may be abrasive and shorten your head’s life. Having omitted this, he may have omitted other caveats. However, he has nonetheless written a very valuable book. If you want to

recognize your sick computer’s calls for help, you should read it. For \$14.95, it is an investment that could pay for itself many times over. ■

Steve Goldman
Cherry Hill, NJ

What Do You Do After You Plug It In?

by William Barden, Jr.

Howard W. Sams & Co., Inc.
4300 West 62nd Street
Indianapolis, IN 46268
Paperback, \$10.95

Whoever chose the title for this book either didn’t read it very carefully or deliberately set out to confuse the potential buyer. It does not tell you what to do after you plug it in. There is practically nothing having to do with computer applications, and only the last 35 pages of this 192-page paperback have anything remotely connected with using your microcomputer in specific tasks. A better title would have been *What The First Time Computer Buyer Should Know*, but I admit that’s not as catchy.

Mr. Barden certainly knows a great deal about computers, but it is hard to decide at whom this book is aimed. It looks to me like just another attempt to cash in on an expanding computer book market.

Since the first few pages are devoted to describing the best system for a specific user (small business, professional, household, or hobby), I assume the book is geared to the computer novice who is considering



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BOOK REVIEWS

**"I would pass
up this
introductory
manual."**

buying his first machine. It moves on to explain 4-, 8-, and 16-bit operations, disk storage, printers, graphics tablets, and light pens. There are chapters on programming languages, operating systems, and what to look for in buying software. The last few chapters discuss modems, speech digitization and recognition, and analog control for home applications. There are no specific programs or designs to perform any jobs, only a general discussion of the topics.

This book suffers from a serious lack of editing. As an example, on the bottom of page 44 we read, "The hard drives are fairly reliable," and on the top of page 45, "Also the hard disk is fairly reliable." The pages are sprinkled with sentences like, "Integrated circuits utilized the knowledge gained in transistor technology and are an offshoot of transistors, both being semiconductor devices that utilize material, such as silicon, that neither conducts electricity well, such as copper, nor is an insulating material, such as glass."

The computer novice receives a large amount of general information in this short book, but I wonder if the first-time user, who must be told twice in the first few pages what memory storage and an 80-column screen are, is going to understand, or even be interested in, address bus lines or instruction sets. To make matters worse, terms such as these are not described or found in the index. If you already have some computer knowledge, I would pass up this introductory manual. If you know practically nothing about computers, you can find better books around. ■

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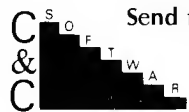


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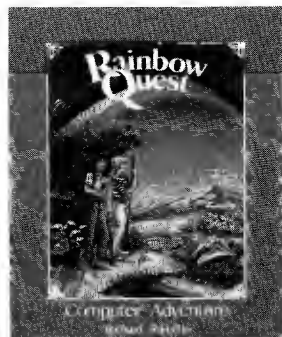
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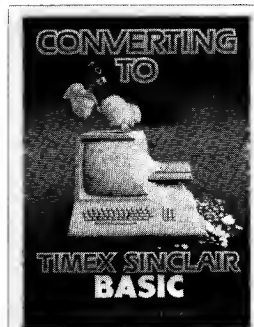
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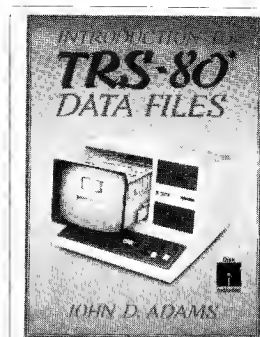
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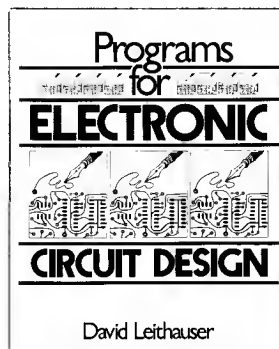
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Introduction to TRS-80 Data Files

Learn by doing with this guide to writing a data base manager. This book, with its accompanying software, takes you through a simple, mailing list program to teach you about sequential and then random access files. The

construction of a DBM and the techniques for moving data to and from disks are discussed. **Book and TRS-80 disk \$24.95, 102 pp.**



Programs for Electronic Circuit Design

Electronics engineers and hobbyists will welcome this guide to electronic circuit design with a microcomputer. Each chapter contains a program involving several different types of applications that use the

same electronic components. The programs can be used individually or combined into one large program with a master menu, as explained in the book. **Software included. \$14.95 128 pp.**

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NEW SOFTWARE

Electronic Storyboard

MultiMedia Software, P.O. Box 5909, Bethesda, MD 20814, announces Storyboard II, a CAI courseware development program used for education and training. Construct lessons with a series of storyboard "pages," representing screens that the students see. You can see and control text, hi-res graphic files, and video disk/tape frame numbers. You need no programming knowledge. Storyboard II comes with editor and lesson driver disks with backups, a manual, and a tutorial cassette for \$185. Reader Service number is 453.

A Low-Cost Practical Solution

PractiCalc II, a powerful spreadsheet with data base and word processing capabilities, is available for \$69.95 from Micro Software International, The Silk Mill, 44 Oak Street, Newton Upper Falls, MA 02164. It features speed, advanced editing, variable column width in all columns, 80-column capability with an 80-column card, upper- and lowercase entry and printing, alpha and numeric sorting and search, automatic and manual recalculation, and on-screen default menu. Reader Service number is 457.

More than Just Plain Jane

Arktronics Corporation has introduced Jane, an integrated program that uses universally-understood pictures and symbols to represent system commands and functions. A mouse bypasses the keyboard to give commands in all but the entering of text and numbers.

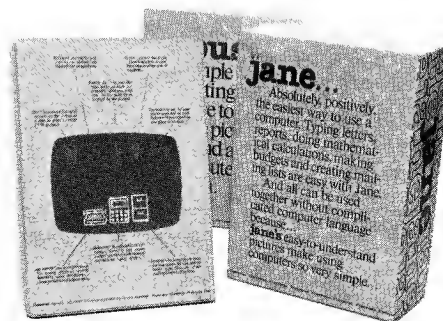
Jane combines three business applications (word processing, spreadsheet, and list management) that can be used separately or together. Use the mouse to move numbers and text between windows. Suggested retail price is \$295. For further information, contact Arktronics Corporation, 520 E. Liberty Street, Ann Arbor, MI 48104. Reader Service number is 450.

Protect Your Apple ///

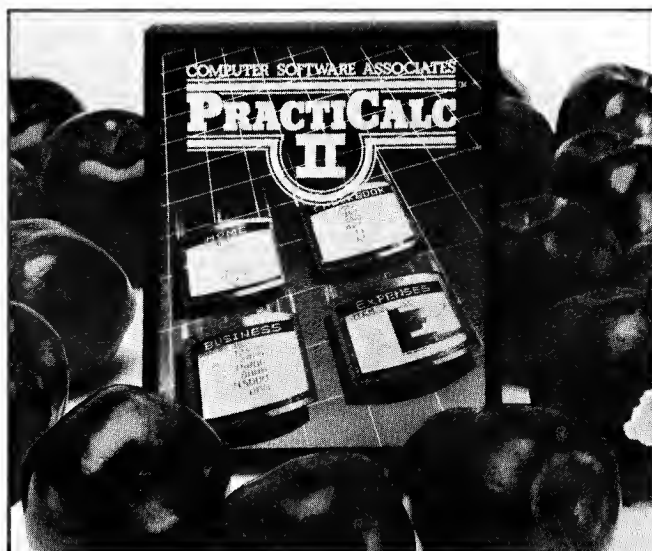
Password III will password protect any type of Apple /// file—spreadsheets, DIF, data bases, word processing files, text and binary files, BASIC/Pascal/COBOL programs, object code, graphics, fonts, and even operating system files. The suggested retail price is \$55. For further information, contact Grebar, P.O. Box 83, Station C, Winnipeg, Manitoba, R3C 3X5, Canada. Reader Service number is 471.



The Electronic Storyboard.



More than just plain Jane.



A low-cost spreadsheet from CSA.

edited by Joan Witham



Computer games about girls.

Computer Games about Girls

Now kids can play computer games featuring girls. These games place lifelike heroines in real-world situations where they face exciting challenges.

Jenny of the Prairie is a spunky pioneer girl who becomes separated from her wagon train and must face the advancing winter alone. Chelsea of the South Seas Islands is stranded on a small Pacific island which she explores and confronts tropical dangers. Cave Girl Clair survives by fire-tending and gathering food and medicinal plants. Lauren of the 25th Century maintains a reclamation project at a sun-baked desert outpost.

Suggested retail price is \$39.95 each. Contact Ad-

dison-Wesley Publishing Co., Reading, MA 01867, for more information. Reader Service number is 460.

I Love America Series

Children in grades four through seven can learn map reading with U. S. Cities from Island Software. Small Town USA lets your fingers do the walking to plot a course across town for imaginary trips. US Map simulates a flight across the country, tests state abbreviations, and presents topology puzzles. History Star is a fast-paced game reviewing American history. Each disk costs \$25. For further information, contact Island Software, Box 300, Lake Grove, NY 11755. Reader Service number is 451.

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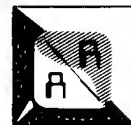
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NEW SOFTWARE

Remember that Important Date

Time-trax is a time and date oriented calendar program. It features menu-driven commands, fast hi-res graphics for sharp displays, up to 311 entries in a month and 99 in a day, eight definable entry categories, flagging of important entries, fast searches by category or any string of data, and printouts of up to 31 days at a time. The suggested retail price is \$99.95. For further information, contact Creative Peripherals Unlimited, Inc., 1606 S. Clementine, Anaheim, CA 92802. Reader Service number is 458.

Choosing the Right College

Peterson's College Selection Service package

helps students locate colleges with the specific characteristics they want. Each package includes floppy disks, two copies of the *Counselor/Student Manual*, a user information card, and one copy of *Peterson's Guide to Four-Year Colleges 1984* for \$135. For further information, contact Peterson's Guides, Dept. 3221, 166 Bunn Drive, P.O. Box 2123, Princeton, NJ 08540. Reader Service number is 464.

Manage Your Professional Time Wisely

Dateminder, a time management tool, is targeted at medical, dental, legal, and other practitioners for efficient memo keeping and event scheduling. Dateminder includes two disks, a



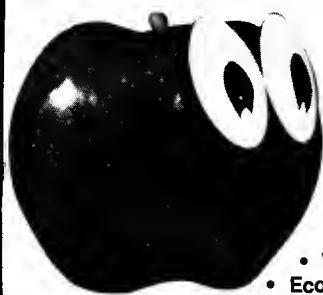
Time-trax is for busy people.

clock/calendar board, and a user's guide for \$275. For further information, contact North American Computer Associates Ltd., 11 North Skokie Highway, Suite 100, Lake Bluff, IL 60044. Reader Service number is 469.

Graphic Games

Penguin has two new strategy games out on the market. Xyphus, a fantasy role-playing game for \$34.95, has a series of scenarios with continuing characters for an infinite

Circle 204 on Reader Service card.



LET YOUR APPLE SEE THE WORLD!

The DS-65 Digisector® opens up a whole new world for your Apple II. Your computer can now be a part of the action, taking pictures to amuse your friends, watching your house while you're away, taking computer portraits . . . the applications abound! The DS-65 is a random access video digitizer. It converts a TV camera's output into digital information your computer can process. The DS-65 features:

- **High Resolution** — a 256 x 256 picture element scan
- **Precision** — 64 levels of grey scale
- **Versatility** — Accepts either NTSC or industrial video input
- **Economy** — A professional tool priced for the hobbyist

The DS-65 is an intelligent peripheral card with on-board software in 2708 EPROM. Check these software features:

- Full screen scans directly to Apple Hi-Res screen
- Easy random access digitizing by Basic programs
- Line-scan digitizing for reading charts or tracking objects
- Utility functions for clearing and copying the Hi-Res screen

Use the DS-65 for precision security systems; computer portraiture; robotics; fast to slow scan conversion; moving target indicators; reading UPC codes, musical scores and paper tape and more! **GIVE YOUR APPLE THE GIFT OF SIGHT!** DS-65 Price: \$349.95 RCA 1500 Series Camera w/6:1 zoom lens Price: \$399.90/Combination Price: \$729.95

ADDITIONAL SOFTWARE FOR THE DS-65

— **Picture Scanner:** An applications tool for processing video images for display on the Hi-Res screen. A variety of dithering algorithms are provided, for compressing the digitized image into the Hi-Res screen and simulating grey scales. Price: \$39.95

— **Superscan:** Enables you to enhance the DS-65's Hi-Res pictures with colors! Choose from 21 different colors and assign them to grey scale values, modify pictures, zoom, enhance contrast, etc. Includes print routines for Anadex 9500 or 9501; Epson MX-80GFT and MX-100; and IDS 460 Paper Tiger*. Written for The Micro Works by Magna Soft. Price: \$79.95

*Paper Tiger is a trademark of Integral Data Systems, Inc.

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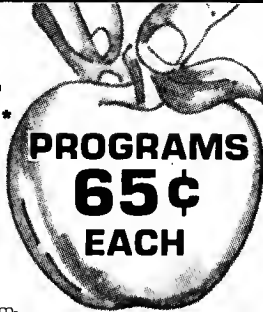
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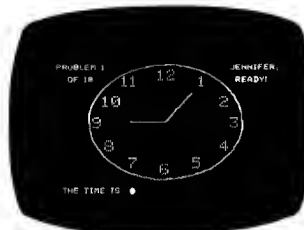

The Medalist Series for social studies classes.

variety of spells, weapons, and monsters. The sergeant in Arcade Boot Camp (\$29.95) wants you for 'Copter Flying, Driving, Shooting, Jumping, and Survival Training.

Contact Penguin Software, P.O. Box 311, Geneva, IL 60134, for more information. Reader Service number is 466.

A Historical Challenge

Six social studies programs from Hartley Courseware, Inc., P.O. Box 431, Dimondale, MI 48821, will challenge social studies classes in grades four through eight. Subjects in the Medalist series (\$39.95 each) include Continents, States, Black Americans, Women in History, Presidents, and a program to create your own learning game in the Medalist format. Each program gives clues and facts at varying levels of difficulty. Reader Service number is 454.



Telling time the easy way.

Gamco Games

New learning games have been released by Gamco Industries, Inc., Box 1911, Big Spring, TX 79720. Telling Time and Math Mastery for grades one through eight combine drill with an arcade-style reward game and a student management system for \$34.95 each. Math Mastery offers carefully selected difficulty levels which place the student at a higher level after successful completion of the previous level. Reader Service number is 467.

Rails West!

In Rails West! (\$39.95), you experience the exciting but risky nature of railroad development. Different scenarios, levels of play, and number of players are among the options for play. The player starts his own corporation or buys a controlling interest in an existing company. Action menus guide you through buying and selling stocks and bonds, applying for a loan, floating securities, and other ventures.

For further information, contact Strategic Simulations, Inc., 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043-1983. Reader Service number is 461.

NEW SOFTWARE

The Art of Negotiating

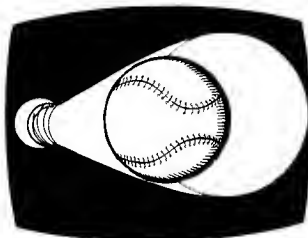
The Art of Negotiating takes you through the negotiating process on the Apple III. Useful for both negotiation preparation and training, this program shows you how to develop successful strategies and negotiating gambits. All information is recorded and interim and final reports can be printed. The package, for \$495, includes a program disk, a user's guide with tutorial, and two books by Gerald Nierenberg on negotiating. For further information, contact Experience in Software, Inc., 2039 Shattuck Avenue, Berkeley, CA 94704. Reader Service number is 459.

Software for the SuperSprite Board

Eight new software programs (\$39.95 each), featuring colorful and animated sprite graphics in both educational and entertainment formats, are available from Syntex, Inc., 10635 N.E. 38th Place, Kirkland, WA 98033.

LOGOSprite allows Terapin Logo users to interface with the SuperSprite board. NumberSprites and AlphaSprites help children learn the basics. SpriteArt provides paint brushes to create imaginative background scenes and characters, and MusicSprites uses graphics extensively to visually create music.

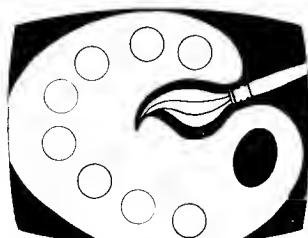
The entertainment games are: KOBOR, a maze-pursuit adventure that features fast animation, sound effects, and speech; BaseballSprites, a rendition of the national pastime; and Assembly Line Madness, a fast-moving game of matching auto parts to cars. Reader Service number is 462.



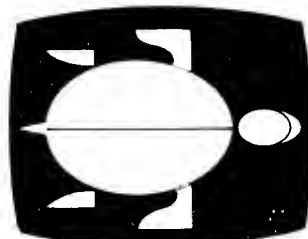
BaseballSprites



MusicSprites



SpriteArt



LOGOSprite

New Arcade Hits

Atarisoft offers more arcade hits (\$34.95 each) for the Apple. In Joust you must knock outlaw knights off their buzzards. Battlezone has enemy tanks, evasive fighters, and flying saucers to escape. Pole

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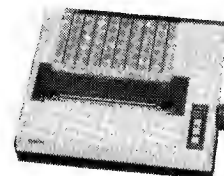


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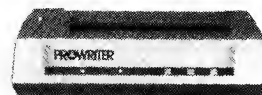


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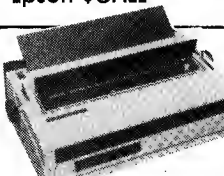
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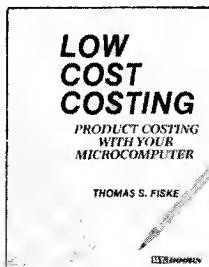
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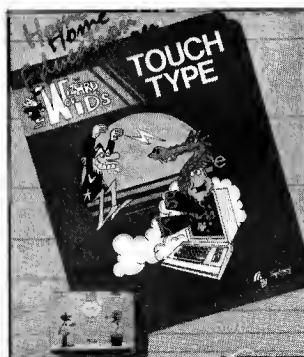
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NEW SOFTWARE



The Wizard of Id teaches touch typing.

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For further information, contact Atari, Inc., 1265 Borregas Avenue, P.O. Box 427, Sunnyvale, CA 94086. Reader Service number is 456.

Keep Track of Your Treasures

The Home Cataloger is an efficient and easy to use filing and cataloging program that allows up to 1500 individual entries. You can customize your filing system or select one of the program's ten cataloging lists, including telephone list, inventory, travel planner, insurance policies, studies, and books. Suggested retail price is \$49.95 from Continental Software, 11223 South Hindry Avenue, Los Angeles, CA 90045. Reader Service number is 452.

Fuzzywomp and the Wizard

Learning with Fuzzywomp (\$29.95), a collec-

tion of four educational games developed for pre-readers, requires no adult supervision to learn pattern matching, counting, number sequencing, and creative play.

Wizard of Id's Touch Type (\$34.95) teaches computer keyboard skills. The Wizard of Id and Spirit make typing practice fun while learning proper typing habits. For further information, contact Sierra On-Line, Inc., 36575 Mudge Range Road, Coarsegold, CA 94306. Reader Service number is 463.

Tool Kit for Graphics

Demco Electronics is marketing the Graphics Tool Kit, a complete hardware/software package for generating a vast diversity of interactive graphics. Priced at \$495, the CAD-capable system claims a resolution 4½ times sharper than now available on the Apple II. The menu-driven software manipulates vector shapes, displays fonts, draws lines, plots points, and saves and retrieves a drawing from disk.

You can generate graphs, charts, sheet music, floor plans, circuit diagrams, mechanical drawings, stylized lettering and logos for newsletters, among other things. For further information, contact Demco Electronics, 10516 Grevillea Avenue, Inglewood, CA 90304. Reader Service number is 468.



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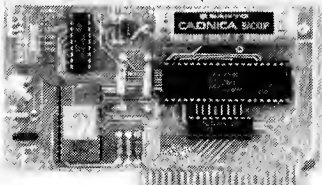
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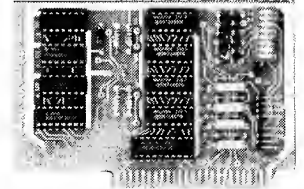
NEW 1984 DESIGN
An official PRO-DOS Clock

- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
- NiCad battery keeps the TIMEMASTER II running for over ten years.
- Full emulation of ALL other clocks. Yes, we emulate Brand A, Brand T, Brand P, Brand C, Brand S and Brand M too. It's easy for the TIMEMASTER to emulate other clocks, we just drop off features. That's why we can emulate others, but others CAN'T emulate us.
- The TIMEMASTER II will automatically emulate the correct clock card for the software you're using. You can also give the TIMEMASTER II a simple command to tell it which clock to emulate (but you'll like the Timemaster mode better). This is great for writing programs for those poor unfortunates that bought some other clock card.
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
- Eight software controlled interrupts so you can execute two programs at the same time (many examples are included).
- On-board timer lets you time any interval up to 48 days long down to the nearest millisecond.

The TIMEMASTER II includes 2 disks with some really fantastic time oriented programs (over 40) including appointment book so you'll never forget to do anything again. Enter your appointments up to a year in advance then forget them. Plus DOS dates so it will automatically add the date when disk files are created or modified. The disk is over a \$200.00 value alone—we give the software others sell. All software packages for business, data base management and communications are made to read the TIMEMASTER II. If you want the most powerful and the easiest to use clock for your Apple, you want a TIMEMASTER II.

PRICE \$129.00

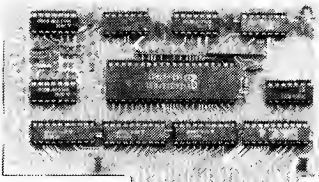
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- It's easy to program music with our compose software. You will start right away at inputting your favorite songs. The Hi-Res screen shows what you have entered in standard sheet music format.
- Now with new improved software for the easiest and the fastest music input system available anywhere.
- We give you lots of software. In addition to Compose and Play programs, 2 disks are filled with over 30 songs ready to play.
- Easy to program in Basic to generate complex sound effects. Now your games can have explosions, phaser zaps, train whistles, death cries. You name it, this card can do it.
- Four white noise generators which are great for sound effects.
- Plays music in true stereo as well as true discrete quadraphonic.
- Full control of attack, volume, decay, sustain and release.
- Will play songs written for ALF synthesizer (ALF software will not take advantage of all our card's features. Their software sounds the same in our synthesizer.)
- Our card will play notes from 30HZ to beyond human hearing.
- Automatic shutoff on power-up or if reset is pushed.
- Many many more features.

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Z-80 PLUS!



- TOTALLY compatible with ALL CP/M software.
- The only Z-80 card with a special 2K "CP/M detector" chip.
- Fully compatible with microsoft disks (no pre-boot required).
- Specifically designed for high speed operation in the Apple IIe (runs just as fast in the II+ and Franklin).
- Runs WORD STAR, dBASE II, COBOL-80, FORTRAN-80, PEACHTREE and ALL other CP/M software with no pre-boot.
- A semi-custom I.C. and a low parts count allows the Z-80 Plus to fly thru CP/M programs at a very low power level. (We use the Z-80A at fast 4MHz.)
- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

Don't confuse the Z-80 Plus with crude copies of the microsoft card. The Z-80 Plus employs a much more sophisticated and reliable design. With the Z-80 Plus you can access the largest body of software in existence. Two computers in one and the advantages of both, all at an unbelievably low price.

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- 80 characters by 24 lines, with a sharp 7x9 dot matrix.
- On-board 40/80 soft video switch with manual 40 column override
- Fully compatible with ALL Apple languages and software—there are NO exceptions.
- Low power consumption through the use of CMOS devices.
- All connections are made with standard video connectors.
- Both upper and lower case characters are standard.
- All new design (using a new Microprocessor based C.R.T. controller) for a beautiful razor sharp display.
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SUPRTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	NO	YES	NO	YES	YES	NO	YES

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

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- Expands your Apple IIe to 192K memory.
- Provides an 80 column text display.
- Compatible with all Apple IIe 80 column and extended 80 column card software (same physical size as Apple's 64K card).
- Can be used as a solid state disk drive to make your programs run up to 20 times FASTER (the 64K configuration will act as half a drive).
- Permits your IIe to use the new double high resolution graphics.
- Automatically expands Visicalc to 95 K storage in 80 columns! The 64K config. is all that's needed, 128K can take you even higher.
- PRO-DOS will use the MemoryMaster IIe as a high speed disk drive.

MemoryMaster IIe 128K RAM Card

- Precision software disk emulation for Basic, Pascal and CP/M is available at a very low cost. NOT copy protected.
- Documentation included, we show you how to use all 192K.

If you already have Apple's 64K card, just order the MEMORYMASTER IIe with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)

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Learning CP/M the Easy Way

The Professor CP/M 3T program teaches and tests the student on the CP/M operating system and its commands. Pro-

fessor CP/M 3T teaches computer literacy with a glossary of computer jargon. Genie, the tutor, responds positively to the students. The package retails for \$99. For further information, contact Software Academy, 2222 Morley Street, San Diego, CA 92111. Reader Service number is 470.

Datamost Announces Three New Games

Ankh tests your reflexes, intuition, and intellect with puzzles using logic, destruction, and the scientific method.

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New games from Datamost.

or three dimensions at different levels of difficulty. All these games are available for \$39.95 each from Datamost, 8943 Fullbright Avenue, Chatsworth, CA 91311-2750. Reader Service number is 455.

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NEW PRODUCTS

Keep Your Disks in Executive Surroundings

Holding up to 120 computer disks, the Rolltop 100 Executive disk file is suitable for either office or home. The suggested retail price is \$39.95. For further information, contact MicroComputer Accessories, Inc., 5721 Buckingham Parkway, Culver City, CA 90230. Reader Service number is 475.

Color Monitor for a Modest Price

The Sakata Model SC-100 CRT Composite Color Display Monitor displays brilliant colors with soft images on your Apple II or //e. The suggested retail price is \$329 from Sakata U.S.A. Corp., 651 Bonnie Lane, Elk Grove Village, IL 60007. Reader Service number is 485.

FingerPrint Your Printer

Print hard copies, in color or in black and white on your screen, with just a push of a button. FingerPrint is a graphic parallel printer interface which adds the Print Screen function that your Apple doesn't have. A disk is included with special programs to zoom around your VisiCalc spreadsheets using your joystick or searching and replacing text on its way to the

printer. Most popular parallel printers, such as Epson, IDS, Okidata, Apple, and Prism, can be used with FingerPrint.

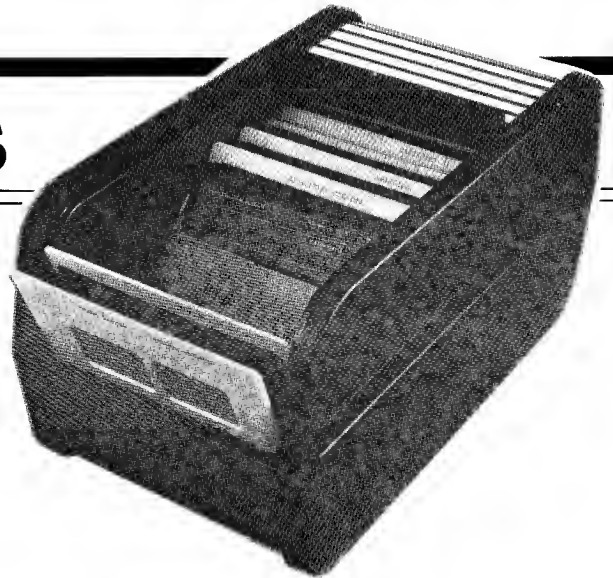
Suggested retail price is \$149. Contact Thirdware Computer Products, 4747 N.W. 72nd Avenue, Miami, FL 33166. Reader Service number is 486.

Sort Disks by Color

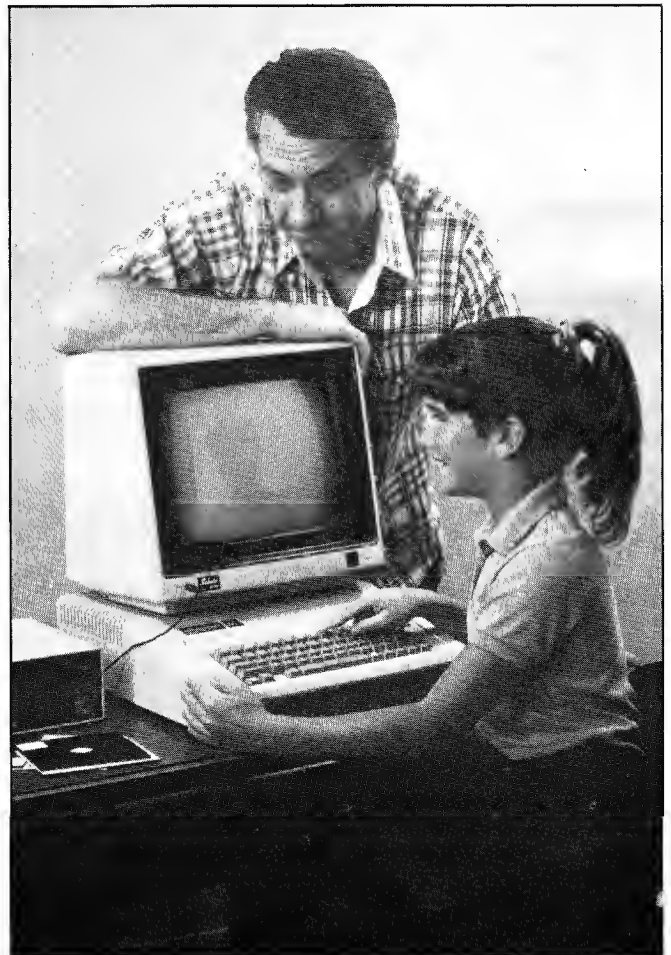
Disktabs come in five bright colors so you can sort your computer disks by similar data or programs. You can write on Disktabs or use them as a handle to take your disks in and out of files and drives. When inserted in the drive, Disktabs extend out beyond the disk so you can see at a glance which disk you are using. Disktabs, from L.D.W. Co., 38211 Logan Drive, Fremont, CA 94536, are sold in sets of ten for \$1.99. Reader Service number is 490.

Hiccups on Your Computer

DX-1 Echo (\$149) and DX-1 Volumes 2-5 (\$79) enhance the DX-1 sound processing system for the Apple II and //e. With DX-1 Echo, over 40 routines are included for real time audio processing, echoing, and reverb. Four volumes of pre-recorded sounds range from piano, saxophone, and guitar to dog barks, hiccups, police

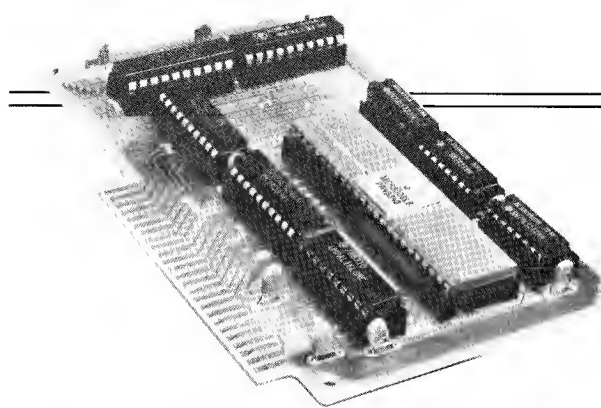


The Rolltop 100 Executive disk holder.

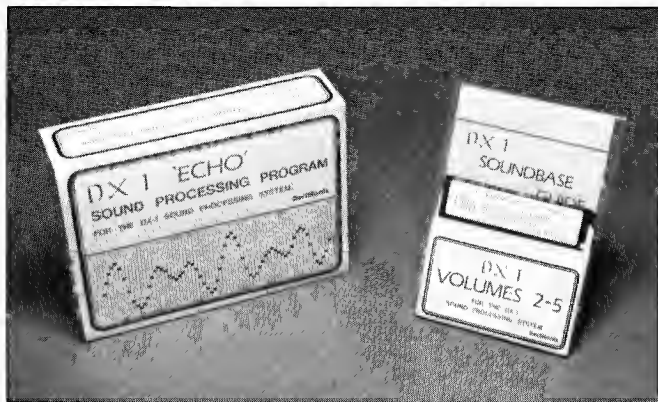


Sakata's Model SC-100 monitor.

edited by Joan Witham



Learn about 68000 computing.



DX-1 Echo sound processing program.

whistles, and screams. For more information, contact Decillionix, P.O. Box 70985, Sunnyvale, CA 94086. Reader Service number is 479.

McMill—Six-Inch Power

Stellation II has designed McMill, a compact six-inch 68000 coprocessor card compatible with all Apple II, II Plus and IIe computers. McMill utilizes Motorola's 68008 processor, which can run all programs designed for the 68000. Included with McMill are complete documentation, schemata, and FIG Forth software. The suggested retail price is \$229 or \$299 with a 68000 cross assembler. For more information, contact Stellation Two, P.O. Box 2342, Santa Barbara, CA 93120.

Reader Service number is 480.

Swivel Your Disks

Disk-O-Tel Model DT will hold up to 108 disks in numbered compartments to easily locate your disks. Mounted on a ball bearing turntable, you will know if any disks are out with one quick rotation. Suggested retail price is \$49.95 from Close Enterprises, P.O. Box 13903, Arlington, TX 76013. Reader Service number is 482.



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Suppress Those (S)urges!

The LG20 Surge Suppressor Multi-Outlet Strip, selling for \$34.95 plus \$2 S/H, offers protection against voltage surges that can destroy electronic components. It features four U-ground outlets, an on/off switch with pilot light, a six-foot cord with three-prong grounding plug, and a push-to-reset circuit breaker that protects against power overloads. For further information, contact Gadgeteer, 1524 Pine Street, Philadelphia, PA 19102. Reader Service number is 476.

Centronics' New Printers

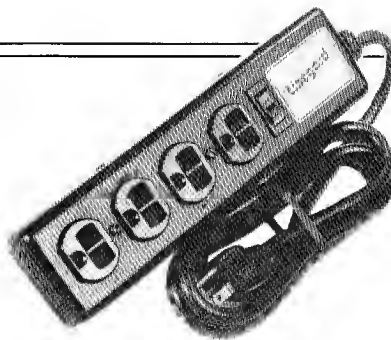
Centronics Data Computer Corp., 1 Wall Street,

Hudson, NH 03051, has introduced two dot matrix printers for use in small systems and personal computer applications. The Model H80 (\$699) has 8.5-by-11-inch and A4 cut sheet for letters with 160 cps. Overstrike, condensed, pica, elite, and true superscript/subscript printing are available.

The Model H136 (\$899) is a wide carriage printer with up to 266 characters per line. It can print 160 cps for data processing printing and 27 cps for letter printing. Both printers have built-in fully adjustable tractors and pin addressable graphics in seven densities. Reader Service number is 487.

The Slim Line

The Distar 5¼-inch Slim Line Floppy Disk



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Centronics' Horizon H80 printer.

Circle 387 on Reader Service card.

WHEN THE CHIPS ARE DOWN . . .

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It's reasonable to suspect that every Apple owner has wondered at some time or another, if all those chips are working up to par, or if it's time for Disk Speed Calibration, Head Cleaning or General Maintenance . . .

Master Diagnostics Plus is a comprehensive diagnostics package for the Apple computers. As a diagnostic set, it can save unhooking all the peripherals and carrying an Apple to the dealer every time a minor hardware problem is suspected or periodic maintenance procedures are required, such as **DISK SPEED CALIBRATION, MONITOR ALIGNMENT, DRIVE HEAD CLEANING**, etc., etc. Necessary maintenance is made easy by the routines and documentation provided.

For those without a service center nearby, the diagnostic routines can save travel or shipping and considerable downtime for minor problems. Anyone fighting glitches in a program would rest a little easier knowing the computer, at least, is working properly.

"Master Diagnostics Plus is an impressive collection of diagnostic routines for the Apple II and Apple II Plus. It is capable for supplying sufficient information so you know whether or not your computer is performing normally. Regular use of the maintenance routines and supplies will help to insure top-notch operation. The peace of mind afforded by being able to regularly monitor computer performance is well worth the price of the program. This package should be in the library of every Apple user . . ." Also received "AAA" reviews in every U.S. Micro Mag.

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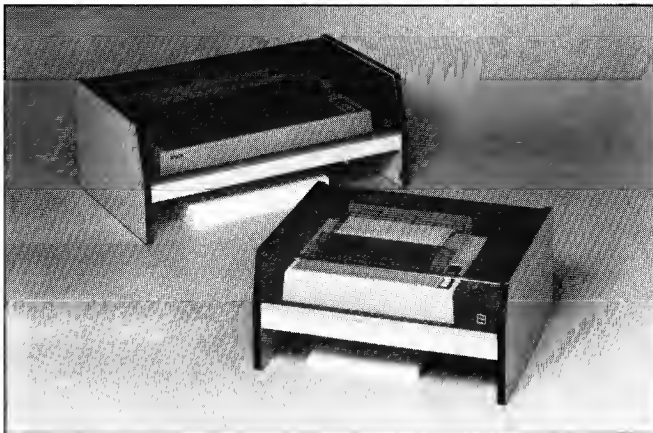
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Computing in executive style.



Quiet-Write acoustical cover and printer stand.

Drive is engineered especially for the Apple II, //e, and Franklin computers. It is quiet operating, has accurate tracking, and has a longer life than conventional belt-driven units. Suggested retail price is \$169. For further information, contact Burke and Associates, 1720 Los Angeles Avenue, #221, Simi Valley, CA 93063. Reader Service number is 483.

Solid Oak Modular Computer Furniture

The Oak 170 Series includes a desk (\$279.95), hutch (\$199.95), printer stand (\$199.95), corner connector (\$69.95), monitor/printer platform (\$44.95), and an optional lockable door module. This expandable series of computer furniture pieces is available from Bush Industries, Inc., 312 Fair Oak Street, Little Valley, NY 14755. Reader Service number is 477.

Keep That Printer Quiet!

Ring King Visibles, Inc., 2210 Second Avenue, P.O. Box 599, Muscatine, IA 52761, helps keep your printer quiet with a Quiet-

Write Acoustical Cover/Printer Stand. The Quiet-Write dampens sound from PC matrix printers and raises the printer above the continuous forms supply to save space. It has a smoke tint acrylic cover and putty-colored laminate construction. Prices range from \$89.95 to \$129.95, according to size. Reader Service number is 474.

Versatile Network Host

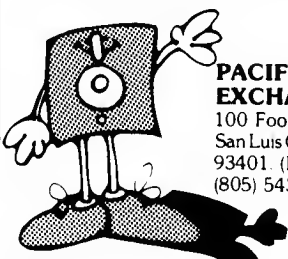
The Netway 274 Multi-Dissimilar Host Cluster Controller connects a wide variety of workstations and peripherals to multiple and dissimilar hosts. Mainframes, terminals, and personal computers can talk to one another locally or over a nationwide network using Netway 274. Each controller supports up to 16 workstations, each connecting up to five multi-point and 16 point-to-point host connections. Prices for the Netway 274 start at \$9150. For further information contact Tri-Data, 505 E. Middlefield Road, Mountain View, CA 94043. Reader Service number is 478.

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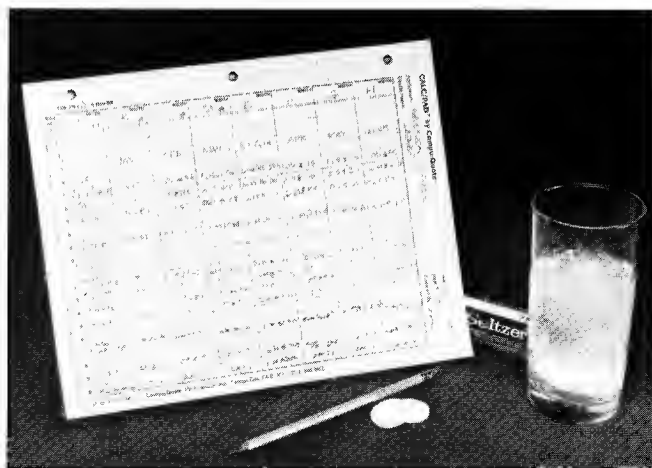
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Check This Product

The Computer Check Carrier processes conventional checks for personal use and for small or medium sized businesses. Designed for adjustable, tractor, or friction type printers, this slotted translucent vinyl-sheeting check holder uses regular checks. Included is a BASIC program to format checks for your own system. It is available for \$11.95 from CHF Co., P.O. Box 185, Oberlin, OH 44074. Reader Service number is 481.



CALC/PAD to design spreadsheets.

Easy-Care Disk Drives

Priced at \$199 and \$299 respectively, the XL (40 track) and XL80 (80 track) disk drives are available from Microsci, 2158 South Hathaway Street, Santa Ana, CA 92705. Packaged in ABS plastic housings, they are slightly larger than standard OEM drives. Product maintenance is low due to fewer parts and a simpler manufacturing process. Reader Service number is 484.

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The Power Director expansion outlet occupies one grounded outlet, providing four to six outlets in its place, with a pilot light and master switch. Each outlet protects against surges, spikes, RF noise, and so forth. Power control and protection centers are available in three models: Model P22 (\$99) offers four outlets; P2 (\$139) offers five outlets, and P12 (\$199) offers six outlets, a digital clock, and a disk storage bin. For additional information,



Microsci's drive with plastic housing.

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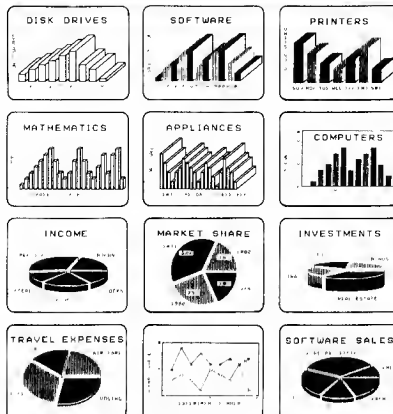
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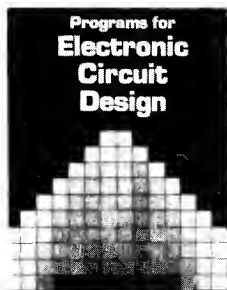
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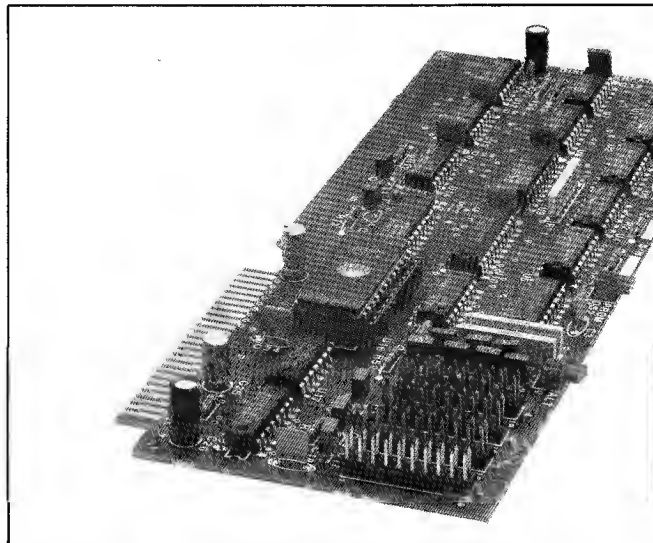
Peripheral Systems, Inc., 23152 Verdugo Drive, Laguna Hills, CA 92653. Reader Service number is 473.

Apple Flies with Concorde

The Concorde C-111, a single-sided 5¼-inch disk drive priced at \$249, will run all software written for the Apple. It plugs directly into the Apple II Controller Card as either drive 1 or drive 2. It can be used with the Concorde C-130 Disk Controller Card (\$89), which supports four drives. For further information, contact Concorde

Extend Your Apple IIe

Expand your Apple IIe's memory with Extend 80, made by Caribbean Computer Sales, Inc., 221 East Osceola, Suite 110, Stuart, FL 33494. Extend 80 plugs into your standard 80-column card and is completely compatible with all existing software, including Apple's new ProDOS. The suggested retail price is \$129. Reader Service number is 472.



The C-130 disk controller card.

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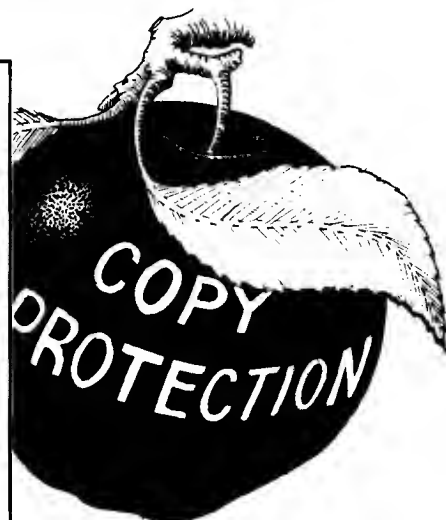
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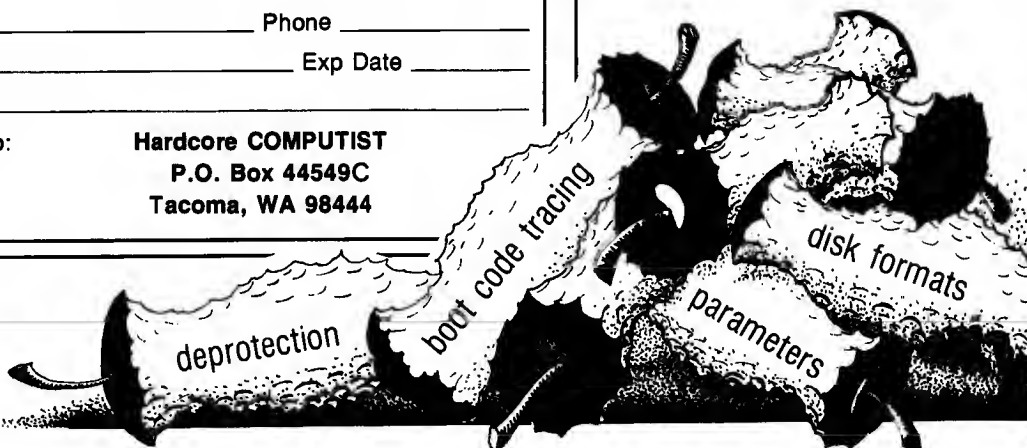
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460 Addison-Wesley	146	318 Fastrack Computer Products	96	310 Northeastern Software	76
168 Addmaster Corp.	94	139 Flexible Software	39	85 ohm Electronics/Scooter	73
534 Alliance Research/DATA SPEC	14	49 Frogg House/Prof. Jones	78	208 Pace Systems/Micro City	83
465 Apple Computer, Inc.	153	476 Gadgeteer	157	31 Pacific Exchanges	158
24 Appeware, Inc.	148	467 Gamco Industries, Inc.	148	* Parker St. Disks	104
* Applied Engineering	135, 152	146 Golem Computers	112	466 Penguin Software	147
450 Arktronics Corp.	145	471 Grebar	145	464 Peterson's Guides	147
57 Arctic Technologies, Inc.	148	66 H & E Computronics	C111	141 Pirate Harbor	133
456 Atari Software	150	427 HARDCORE Computist	161	311 Practicorp/Micro Software Int'l	71
179 Beagle Bros	90, 91	454 Hartley Courseware, Inc.	148	437 Prestidigital Software	158
344 Bill Cole Enterprises, Inc.	77	229 High Order Micro Electronics	89	49 Prof. Jones/Frogg House	78
* Bottom Line	36	405 Hollywood Hardware	19	521 Programs Plus	144
328 Broderick & Associates	153	398 Holmes Enterprises, Inc.	128	274 Protecto Enterprises	121, 122, 123
346 Broderick & Associates	136	263 Human Systems Dynamics	97	234 Quadram	11
483 Burke & Associates	157	304 Human Systems Dynamics	20	16 Quinsept, Inc.	141
477 Bush Industries, Inc.	158	419 Human Systems Dynamics	37	519 Quorum	126
* Business Computers		inCider		* RCM Software	134
of Peterborough	43	Advertising Ad	156, 157	189 Ring King Visibles	59
284 Byte General, The	86	Back Issues	158	474 Ring King Visibles	158
6 Bytes & Pieces	109	Foreign Dealers	141	140 Rule One	94
335 C & C Software	141	Mailing List	157	* Safeware	87
428 Cal-Abco	45	Subscription Ad	56	485 Sakata U.S.A. Corp.	155
* Caribbean Computer Sales	113	Subscription Problems	104	223 Sav-soft Products	141
472 Caribbean Computer Sales	160	Toll Free Ad	156	85 Scooter/ohm Electronics	73
361 Central Point Software	26	University Microfilms	159	* Sensible Software	101
487 Centronics Data Cbrp.	157	12 Interactive Microware	132	463 Sierra On-Line	150
481 CHF Co.	159	532 International Software 2000	126	* Smith Corona	30
482 Close Enterprises	156	451 Island Software	146	470 Software Academy	153
489 Compu-Quote	159	162 J & M Software	134	531 Softcider, Inc.	127
488 Computer Accessories Corp.	159	536 Jamco	85	266 Softronics	16
254 Computer Outlet	154	jr Subscription Ad	66	520 Spectralgraphics	159
* Computer Plus	149	535 Juki Industries	3	533 Spies Lab	110
473 Concorde Peripheral Systems, Inc.	160	86 Kensington Microware	79	67 Stellation Two	94, 136
452 Continental Software	150	315 Koala Technologies, Inc.	C11	480 Stellation Two	156
163 Core Concepts	40	490 L.D.W. Co.	155	461 Strategic Simulations, Inc.	148
458 Creative Peripherals	147	306 Locus Systems	120	355 Street Electronics	38
CW Communications/Peterborough		56 Madwest Software	111	82 Strictly Software	108
110 Bind-in	98	208 Micro City/Pace Systems	83	156 Sublogic Communications Corp.	9
110 WG Books	150	352 Micro Design	21	517 Such-A-Deal	116
110 WG Books	160	245 Micro Management Systems	128	8 Sun Research, Inc.	98
110 WG Books	142, 143	523 Micro Minds Unlimited	87	222 Sweet Micro Systems	46, 47
455 Datamost	153	360 Micro Program Designs	113	525 Swenson Assoc., Inc.	103
534 DATA SPEC/Alliance Research	14	513 Micro Signal	120	462 Syntex, Inc.	149
479 Decillionix	155	457 Micro Software International, Inc.	145	486 Thirdware Computer Products	155
468 Demco Electronics	150	204 Micro Works	147	129 Thunderware	13
3 Dennison Computer Supplies	CIV	475 MicroComputer		278 Titan Technologies	22
367 Digital Images	159	Accessories, Inc.	155	478 Tri-Data	158
* Diskette Connection	149	484 Microsci	159	402 TSK Electronics	7
108 Diversified Software Research	137	311 Microsoft Int'l/Practicorp	71	264 Utilico Microware	129
247 Dorsett Educational Systems	34	453 MultiMedia Software	145	182 Videx, Inc.	57
30 Dow Jones News Retrieval	29	380 Nibble Notch	153		

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- ☐ 1. Yes ☐ 2. No

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J. How many people read your issue of *inCider*?

- ☐ 1. 1 ☐ 4. 4
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51	56	61	66	71	176	181	186	191	196	301	306	311	316	321	426	431	436	441	446
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102	107	112	117	122	227	232	237	242	247	352	357	362	367	372	477	482	487	492	497
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104	109	114	119	124	229	234	239	244	249	354	359	364	369	374	479	484	489	494	499
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